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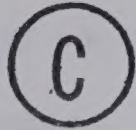
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PRODUCTIVE SOCIETY: A STUDY OF
JUNIOR HIGH SCHOOL STUDENT OPINION

by



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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Productive Society: Study of Junior High School Student Opinion" submitted by John Adamec in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

The study reported here was based upon Lewchuk's description of productive society (in terms of twenty-three characteristics) during five ages or time periods. The purposes of the study were: (1) To determine how specific groups of junior high school students in the Calgary Separate School System ranked, in order of importance, twenty-three characteristics of productive society. (2) To determine which of five ages of productive society was considered, by specific groups of students, to be the most important for twenty-three characteristics of productive society and also which of the five ages was considered to be the least important.

Data for the study were gathered by administering an instrument called "The Student's Opinionnaire of Productive Society" to a sample of junior high school students. The instrument was an adapted form of the "Opinionnaire On Productive Society" which was developed by Lewchuk in a previous study (Lewchuk 1969). The revised instrument contained: (1) A booklet defining Lewchuk's twenty-three characteristics of productive society. (2) Part 1, containing 253 pairs of characteristics. The pairs were obtained by pairing each of Lewchuk's twenty-three characteristics with each other. (3) Part 2, consisting of a reworded form of Lewchuk's "Part Two of the Opinionnaire On Productive Society."

The instrument required the students to give their opinion in two ways: (1) To select, from each pair of characteristics of Part 1, the characteristic which was most important in their type of productive

society. (2) To select, in Part 2, the most important and also the least important statement about productive society for each of the twenty-three characteristics.

The instrument was refined as a result of a pilot study and then administered to a stratified random sample of junior high school students selected from the junior high school population in the Calgary Separate School System.

The data from Part 1 were analyzed according to the experimental procedures for Thurstone's matched pairs. Data from Part 2 were analyzed in the same manner used by Lewchuk for Part Two of his "Opinionnaire On Productive Society."

Scale values and also correlation values indicated a similarity in the way in which students ranked the twenty-three characteristics of productive society. Therefore, it was concluded that junior high school students in Calgary Separate Schools held similar opinions with regard to the relative importance of specific characteristics of productive society. Furthermore, because the industrial arts group ranked occupations as eighteenth in order of importance and materials, production systems and consumer products as three of the least important characteristics of productive society, it was concluded that perhaps some of the objectives of the junior high school industrial arts curriculum for Alberta were not being achieved in Calgary Separate Schools. Finally, it was concluded that the understanding of present day productive society, held by junior high school students in Calgary Separate Schools, was low.

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Chapter 1

INTRODUCTION AND PURPOSE OF THE STUDY

Introduction

During the 1960's the trend in education was for change and innovation. This trend resulted in extensive revisions to much of the existing curricula and in some instances, it was instrumental in the implementation of totally new ideas in numerous subjects taught in elementary and secondary schools. Furthermore, the curriculum changes which have taken place were not limited to only the academic subjects; changes were also made in the non-academic subjects. One example of a non-academic subject in which extensive curriculum changes have been made is industrial arts. In Cochran's (1969) words

Innovation and change have permeated curriculum development in industrial education during the Sixties. In fact, more innovative programs with broader implications have been developed during the past 10 years than in any of the preceding decades [p. 47].

It cannot be disputed that several new industrial arts programs have emerged in the "Sixties", however although each program had certain unique characteristics, a number of them appeared to have one identical purpose. This purpose was stated as early as 1924 by Bonsor and Mossman (1924, pp. 3-18). More recently, Nelson (1970) expressed it in the following manner

By all means, industrial arts should consist of carefully selected learning experiences gained through work in the laboratory that provide boys and girls with the substance of a broadened and enriched understanding of our American

way of life,¹ and in particular, the industrial and technical components of it [p. 95].

Programs such as the Alberta Plan, The Industrial Arts Curriculum Project, and Enterprise: Man and Technology, all had the purpose stated by Nelson, even though the purpose was not expressed in Nelson's words. In these programs, the purpose of industrial arts was described as a study of the aspects of a productive society or as a study of the world of work.

A study of productive society or the world of work has been the focal point of several industrial arts programs. It has, in fact, become the overall objective of the junior high school industrial arts program in Alberta.² The fact remains however, that although much has been written by educators about productive society and how an understanding of it is taught through industrial arts, the research done by educators to determine how the concept of productive society is understood by teachers and students alike has not been as abundant as their writings.

¹In Canada this phrase could read: "our Canadian way of life" or, "our North American way of life".

²The 1969 junior high school curriculum guide for industrial arts states, "Industrial arts is a subject area, the scope of which introduces students, both boys and girls, to all aspects of productive society . . . [p. 3]".

Purpose of the Study

As stated in the introduction, research done to determine how the concept of productive society is understood by teachers and students has not been abundant. In Alberta there has only been one study conducted. The study was recently completed by Lewchuk to determine how industrial arts teachers in the Province of Alberta interpreted the concept of productive society. In his recommendations Lewchuk (1969, p. 189) stated that his instrument (Opinionnaire on Productive Society) should be reorganized and administered to students of industrial arts and also to students not involved in industrial arts to obtain comparisons of the understandings about productive society. Thus, it was this recommendation, and also the fact that little has been done in Alberta to assess the students' interpretation of productive society which led to this study.

Statement of purpose. The purpose of this study was to determine how junior high school students in the Calgary Separate Schools interpreted the concept of productive society. The purpose was divided into the following tasks:

1. To determine how specific groups of junior high school students ranked, in order of importance, twenty-three characteristics of productive society. The groups were arranged in the following manner: industrial arts students, non-industrial arts students, male students, female students, and all groups combined.
2. To determine which of five ages of productive society was considered, by specific groups of junior high school students, to be the most important for twenty-three characteristics of productive society. The groups were arranged as follows: industrial arts students, non-industrial arts students, male students, female students, and all groups combined.

3. To determine which of five ages of productive society was considered, by specific groups of junior high school students, to be the least important for twenty-three characteristics of productive society. The groups were arranged as follows: industrial arts students, non-industrial arts students, male students, female students, and all groups combined.

Need for the study. Both Popper (1964, p. 58) and Easley (1967, pp. 1-8) maintained that research should be done in a "piecemeal" fashion whereby each domain is carefully examined, researched and explained. In this fashion one piece of research can augment another and thus, broader and broader generalizations can eventually be drawn.

If what Popper and Easley said can be accepted, and if it can also be accepted that research provides one means through which educational curricula may be improved, then there is a need for a study such as this one because it could provide some information which might assist in the improvement of industrial arts. It would be naive to assume that the study would provide the answers to all of the questions which plague curriculum builders, or that it would result in immediate changes in the existing Alberta industrial arts curriculum; however, it could serve to expand, in a small way, the existing body of knowledge about industrial arts and its role in teaching the concept of productive society. In particular, information is needed to add to the body of information obtained by Lewchuk who conducted a study with industrial arts teachers in Alberta to determine how they interpreted productive society. In this manner, by adding to the information provided by Lewchuk's study, a "piecemeal" research into industrial arts and its study of productive society could be initiated

because this piece of research could be followed by others.

There is a need for a study such as this one in curriculum improvement apart from its role in "piecemeal" research. In September 1969 the Department of Education in Alberta adopted a new junior high school industrial arts curriculum whose overall objective states, "Industrial arts is a subject area, the scope of which introduces students, both boys and girls, to all the aspects of productive society . . . [p. 3]." Once a curriculum or a program of studies has been prescribed, some form of evaluation must follow to determine whether the objectives of the program are being achieved. In Dudley's (1970) words, "When a program is organized and put into operation, there ultimately comes a time when the question must be answered: 'How well are we doing?' [p. 54]." Evaluation is an integral part of the curriculum planning process; however, evaluation must be done in relation to some criterion. As noted by Saylor and Alexander (1967), "To evaluate is to determine the value or worth of something, and the worth is expressed in relation to some type of criterion [p. 233]."

The need for a study such as this one is twofold. First, there is a need on both the provincial and the local levels to establish basic criteria for evaluation. This study could serve as a starting point in the development of one such criterion. Second, as expressed by Saylor and Alexander (1967, p. 263) the starting point in sound curriculum planning is an assessment of curriculum needs. Therefore, if one accepts Byrne's (1967) statement that "there is a need somewhere in the school system for an understanding of what is happening

in our industrial society [p. 562]," then this study could serve as an indicator from which industrial arts teachers in Calgary Separate Schools could assess their curriculum needs. In other words, assuming that an understanding of productive society is one of the important factors of industrial arts, then once the attitude or opinion held by students about productive society is established, teachers could continue the process further by determining areas in which there is a lack of understanding and begin teaching for a better understanding of productive society.

Definition of Terms

The terms productive society, characteristics, modern craft age, machine age, power age, atomic age and cybernetics age have specific meanings in the study; therefore, it is imperative that they be defined. The definitions for these terms were adapted from Lewchuk's study.

Productive society. There was no specific definition of productive society given in Lewchuk's study; only a concept of productive society was described. In Lewchuk's (1969) words

The concept of productive society encompasses a variety of different ideas. For the purposes of this study, the concept was organized into certain identifiable characteristics that were isolated and extracted from the literature. These characteristics, within a specific period of time, constituted the explanation of productive society [p. 14].

Therefore, for the purposes of this study, productive society was defined as a concept which is described in terms of Lewchuk's twenty-three characteristics.³

³A detailed explanation of how Lewchuk obtained a description of productive society and the twenty-three characteristics is given in Chapter Two.

A characteristic, for the purpose of this study, was any one of the twenty-three concepts which Lewchuk used to describe productive society. Examples of these concepts or characteristics are: tools, labor, management and personnel, and economic structure.

The modern craft age, for the purpose of this study, was a period of time between 1400 A.D. and 1800 A.D., when skilled craftsmen flourished and the use of unskilled labor was required to perform the physical tasks.

The machine age, for the purpose of this study, was a period of time between 1785 A.D. and 1880 A.D. During this time steam power was predominant in the manufacturing industries and made the beginning of mass production possible.

The power age, for the purpose of this study, was a period from 1870 A.D. to 1950 A.D. and whose dominant feature was the widespread use of electricity. Toward the end of this period automation became important.

The atomic age, for the purpose of this study, was a period of time between 1950 A.D. and 1965 A.D. During the atomic age nuclear power was developed as a source of energy. The computer was also being developed.

The cybernetics age, for the purpose of this study, was the period of time from 1964 A.D. to the present date. It resulted when computers were relied upon to perform the work function with rapidity and precision that was impossible for humans to duplicate.

A junior high school student, for the purpose of this study, was any student in either grade seven, eight or nine.

Limitations

This study, like all studies, has limitations. One limitation resulted from the researcher's acceptance of Lewchuk's description of productive society and his twenty-three characteristics. The study, therefore, relied a great deal on the accuracy and validity of Lewchuk's work. A second limitation stemmed from the method of collecting data. Because the data were collected by administering a written instrument, the accuracy of the obtained data was influenced by the reading ability of the students. Finally, the study was limited because not all students participated in the study. Only a sample of junior high school students attending Calgary Separate Schools during the 1969-1970 school term was included in the study.

Method

The study was conducted within the Calgary Separate School System and the population for the study consisted of both male and female junior high school students within this system.

Data for the study were obtained by reorganizing Lewchuk's "Opinionnaire on Productive Society" and administering it to a stratified random sample of junior high school students. A reorganization of the "Opinionnaire on Productive Society" consisted of changing the wording to apply to students, lowering the reading level to a junior high school level, and defining the characteristics which the students were to react to.

The reorganized instrument, entitled the "Student's Opinionnaire of Productive Society", was administered to a small pilot sample

of students to further refine the instrument. Finally, the refined "Student's Opinionnaire of Productive Society" was administered to the selected sample of junior high school students.

Chapter 2

REVIEW OF LITERATURE

Introduction

To the present time considerable literature explaining the developments in industry and their effects on productive society has been written by educators. Many of the writers agree that an understanding of productive society should be a part of every individual's general education. In particular, several educators in the field of industrial education have maintained that industrial arts is a part of general education and should therefore be a study of all aspects of productive society. The study of productive society in industrial arts has been advocated for decades. Bonsor and Mossman (1924) indicated it as a purpose of industrial arts when they formulated a definition of this subject area over forty years ago. In their definition they stated

The industrial arts are those occupations by which changes are made in the forms of materials to increase their values for human usage. As a subject for educative purposes, industrial arts is a study of the changes made by man in the forms of materials to increase their values and of the problems of life related to these changes [pp. 3-18].

In 1957, Hornbake made the following statement

The acceptance of industrial arts into the family of school disciplines assumes that the world of work, particularly the phenomena of industry, constitutes a legitimate area of study. Can a person who lives in an industrial democracy lay claim to being an educated person if he has not become aware of the basic processes by which society maintains itself [pp. 14-15].

Hostetler and Young (1959) maintained that the purpose of industrial arts is to provide experiences which will enable the student to solve the technical problems of living in a highly industrial age. They specifically stated

These experiences are not those which prepare for a trade or vocation, but are designed to familiarize the student not only with materials, processes and tools of industry but also with industry as a science and invention--as a means of producing goods and services--and as a unique pattern of human relationships [p. 3].

Finally, perhaps the most elaborate purpose of industrial arts was given by Evans (1963) when he stated

Rather, industrial arts-general education should turn for its content to the industrial sociologist, the economist, the industrial psychologist, the industrial anthropologist, the specialist in industrial organization, the specialist in labor management relations, etc.

. . . .

They will be concerned with the structure of industry and the identification of principles of industrial life [p. 31].

In the quotes above and in industrial arts literature in general there appears to be a consensus that industrial arts education is concerned with interpreting the world of work or productive society. A question which comes to mind at this point is--"Why is a knowledge about the world of work or about productive society considered to be important?" At a symposium at the University of Wisconsin, Ruttenberg (1962) stated

Increased productivity is a western cultural phenomenon. It rules our lives. Each of us, in our own fields of specialty, are riding our canoes over the rapids, dedicating ourselves to finding new and better ways of increasing productivity, ever accelerating the pace of our racing canoes.

. . . .

The impact of increased productivity on the face of American society has been to commit 183,000,000 people to this limitless enterprise [p. 41].

Ruttenberg's statements about the impact of increased productivity on society is probably the key reason why a knowledge of productive society has become important.

Man has always been concerned with the production of goods and services for human consumption; and "how to increase productivity in society is the basic underlying problem in economics (Jehring, 1967, p. 10)." Increased productivity in North America has been a result of technology. Technology and technological change have resulted in continuous improvement in production methods. In Lewchuk's words (1969) "Technology 'spelled' increased productivity and improved the economic situation [p. 5]." Technological change has been responsible both for the discarding of obsolete methods and practices and for substituting newer, improved methods, machines and materials. Consequently, in North America technological change has resulted in a high level of industrialization where mechanization, automation and cybernation play a dominant role. Thus, technology has enabled a society, which at one time was basically agrarian, to become a highly productive society in which industry stands out as the dominant institution (Luetkemeyer, 1968, p. 15).

Industry has enabled man to increase productivity and to make his work easier; but at the same time it has had an overwhelming effect on his family and social life. As Luetkemeyer (1968) noted, "Industry has had a direct impact not only on man's own social and

personal (family) life but to some degree determines even the basic class structure of modern society [p. 15]." In addition, he went on to say

Besides its place in man's social and family life, industry has altered man's physical and social environment. Physically, the growth of modern urban manufacturing centers has led to the necessity for extensive housing developments, expanding means of transportation, and the complex financial systems resulting from these industrial advances. Thus industry may be cited as the indirect cause of the social and physical problems created by urban living: the problems of unemployment; slum areas; smog, air pollution, sanitary, and other health conditions. Socially, it is industry which has established the distinctions between the working class, the professional middle class, and the financially affluent upper class [pp. 15-16].

Consequently, industry, with production and increased productivity as its central purposes, has had a profound effect in shaping our present day productive society. As a result, several educators have suggested that every citizen should have an understanding of the world of work or productive society because it will affect his own life as well as the lives of his fellow men. In this regard the American Council of Industrial Arts Supervisors (1963) wrote the following

Knowledge of the impact of automation on society, the decentralization of industry, the development of economic interdependence, the fundamental principles of industrial processes, and the utilization of human resources are desirable if today's citizens are to function intelligently [p. 5].

Hornbake (1959) was more emphatic about citizens' knowledge in this field. He maintained that

Responsible behavior in an industrial society requires every person, regardless of his occupation to know something specific about the operation of industry.

. . .

No one can lay a rightful claim to being an educated person today unless he has come to understand some of the components of an industrial society [p. 104].

If the above quotations can be accepted as valid indicators, then it appears that productive society is an important concept which must be understood by everyone. Therefore, research to determine how this concept is interpreted in the education sector is merited. Research in this area has been limited; however, a study to determine how industrial arts teachers in Alberta interpreted the concept of productive society was recently completed by Lewchuk (1969).

Lewchuk's Study⁴

The purpose of Lewchuk's study was to determine how industrial arts teachers in the Province of Alberta interpreted the concept of productive society. His study consisted of two distinct tasks. The first task was to develop a description of productive society through a library research. The second task was to develop an instrument, from his description of productive society, to be used in determining how industrial arts teachers interpreted the concept of productive society. A review of the two tasks follows.

Lewchuk's Description of Productive Society

Lewchuk's development of a description of productive society began with an extensive review of literature from the disciplines of sociology, psychology, education, history and the physical sciences

⁴Because the material in this section was extracted only from Lewchuk's thesis, all references are to his work unless otherwise noted.

in an attempt to identify the characteristics that describe productive society. He defined characteristics as the entities that are a part of industrialism and stated that

Industrialism refers to social and economic organization as characterized by large industries or large nations. Some elements included are, urbanization, modernization, machine production and a new concept of mass society. Economic development is most important: the ultimate success of a nation depends upon the strength of industrialism. Productive society encompasses not only industrialism but the educative and social organization for which industrialism functions. Industrialism, for the purpose of this study, is a part of productive society [p. 15].

Through the course of his library research Lewchuk found that certain characteristics reappeared in the literature and that these characteristics were all described in terms of work function, the industrial scene, significance of productivity and technology. Therefore, for his study Lewchuk selected the characteristics which reappeared in the literature as being descriptive of productive society. He stated

An extensive review of literature has shown that productive society encompasses certain significant characteristics that are a part of productivity, industrialism and society as a whole

. . .

The consensus of the authors reviewed and the frequency of the topics discussed by them suggested that in their opinion the following characteristics accurately describe productive society [p. 25].

The characteristics which he considered to be descriptive of productive society were:

1. Power and energy
2. Natural resources
3. Tools
4. Materials
5. Work skills
6. Inventions and developments
7. Scientific developments - biology, physics, chemistry

8. Production systems
9. Processes
10. Transportation
11. Communication information
12. Labor
13. Management and personnel
14. Economic structure
15. Industrial organization
16. Marketing
17. Planning and control
18. Training and education
19. Occupations
20. Services
21. Consumer products
22. Environment
23. Socialization

After he had identified the characteristics which he considered to be descriptive of productive society, Lewchuk reviewed literature to isolate specific periods in history where significant technological development took place which he could utilize to trace the development of the characteristics. He stated that, "In order to trace the development of these characteristics five distinct ages were considered as the periods in history where significant technological development has taken place [p. 26]." The derivation of the five ages was based upon Mumford's three stage evolution of technology (eotechnic, paleotechnic and neotechnic) and on other literature.⁵

⁵Lewchuk stated, "Mumford uses three stages or time periods to describe civilization and technology as it occurred in early years. The terms are only indications of time where certain significant technological developments occurred. Miller (Allen, et al., 1957) also devised a method where he described concepts in a certain period of time. This study was based upon these structures and a review of other literature to attempt to arrive at a total description or structure of productive society [p. 27]."

The names and dates for the five ages isolated by Lewchuk were:

- | | |
|---------------------|------------------|
| 1. Modern craft age | 1400 - 1800 A.D. |
| 2. Machine age | 1785 - 1880 A.D. |
| 3. Power age | 1870 - 1950 A.D. |
| 4. Atomic age | 1950 - 1965 A.D. |
| 5. Cybernetics age | 1964 - present |

An examination of the five ages reveals an overlap in dates between ages. Lewchuk noted that the overlap in the dates indicated that it was impossible to show the ages as separate entities in chronological development. He also stated that technological developments before the modern craft age were not considered "because no useful purpose [for his study] would be achieved by examining these developments. Only the factors that had significant influence upon the development of an industrial society have been considered [p. 28]." Lewchuk described the ages as follows:

1. The Modern craft age began in the fifteenth century with the advent of modern civilization. New trade routes were opened, skilled craftsmen flourished and the use of considerable unskilled labor was required to perform the physical tasks which supported some form of productivity.
2. The Machine age was heralded by the invention of the steam engine and its application to the textile industry in 1785. Steam power predominated the manufacturing industries and made possible the beginnings of production.
3. The Power age was characterized by the widespread use of electricity. 1870 saw the production of the first practical generators for industrial and domestic use. Electrical energy made possible the development of automatic and transfer machines that revolutionized the industries. Towards the end of the power age, automation became the symbol of modern industrial society.

4. The Atomic age was characterized by the development of nuclear power as a significant source of energy which will likely last for generations to come. Automation became more sophisticated and the development of the computer added to the already complex technological development.
5. The Cybernetics age resulted when cybernated systems were introduced to perform work with such rapidity and precision that it became impractical and impossible for humans to duplicate the work. Cybernetics became the control of the work function which relied upon the use of computers.

When he had identified the characteristics of productive society and established the ages in which to develop them, Lewchuk developed each characteristic in each of the five ages and constructed a chart (APPENDIX E) describing productive society.

To serve as an example, the development of the power and energy characteristic is presented below and a complete outline of Lewchuk's development of the characteristics through the five ages is given in APPENDIX A.

Power and Energy by Ages

Modern craft age. "The development of power and energy was in very simple stages and crudely organized." In the early part of this era muscle of humans and animals was the main source of power while wind and water power, in the form of windmills and water turbines came into use towards the end of the modern craft age.

Machine age. This age was directly responsible for the industrial revolution. The developments can be summarized as follows:

1. Human muscle power was still employed.
2. The steam engine was the main source of power.

3. Line and shaft transmission became important to facilitate the transmission of newly developed power.
4. The use of coal in the latter part of this age increased the fuel supply.
5. Development began on compound engines, internal combustion engines and thermodynamics.

Power age. Because of the wide use of coal, electricity replaced the steam engine and the use of electric motors resulted in efficient and effective production methods. Other developments were:

1. The discovery of petroleum in shallow wells and methods of refining petroleum made the internal combustion engine popular.
2. Because the internal combustion engine was portable it revolutionized the transportation industry.
3. Coal gas was being developed for lighting and heating.

Atomic age. Atomic energy became the single most important characteristic of the atomic age and its peacetime use has pointed the way to the highest standard of living enjoyed by the human race. Lewchuk stated that atomic energy differs from present fuels in the following ways: The potential energy is thousands of times greater than that of conventional fuel, production of nuclear energy is self-reproducing, and the amount of recoverable natural uranium is far greater than that of fossil fuels. The National Planning Association (1957) and Lansdell (1958) concluded that atomic energy development has resulted in the rise of the following:

1. Availability of new constructional materials and methods of fabrication and processing.
2. Atomic power reduces fuel consumption thereby having an influence upon the economic aspect of energy conversion.

3. The Science of nuclear developments cannot be contained and the theories are obtainable to anyone in the world producing the hazards of radiation exposure.
4. There are questions of military security and international safe keeping.

However, the development of atomic energy has also influenced the development of industrial techniques. Lansdell noted that the influence has been in three ways:

1. By evolving a new flotation and ion exchange process for ore concentrations and powdered metallurgy.
2. Production of new alloys with high heat and corrosion resistance.
3. Production of process by-products of commercial value for development of plastics, oils and paints.

Atomic energy has been used for the following:

1. The production of electrical power. This has been the most common peacetime use.
2. The application of radioisotopes for detection purposes in medicine to treat cancer.
3. In chemistry and physics it has served to develop further research techniques.

Cybernetics age. The availability of resources is limited and there has been a rising danger of resource depletion because of the increased demand resulting from increased population and from technological change. As petroleum wells get deeper and coal reserves become thinner, energy becomes more costly; therefore, resource conservation and more efficient uses of resources has become a prime concern in the cybernetics age. Furthermore, natural gas has become a significant form of energy for domestic and industrial use; and, shale oil and tar sands are becoming important sources of petroleum. Lewchuk listed the

following as significant developments that have taken place in the power field during the cybernetics age:

1. Increased use of water power in the form of hydroelectric stations.
2. Research into tidal power for electrical generation.
3. Wind power is being investigated. Several experimental plants of large capacity have been built and operated.
4. Solar energy has become common for charging of storage cells.
5. Biological energy has a prospect for food production and chemicals by the process of photosynthesis.
6. Nuclear energy is expanding in use and will easily become the most common source of energy and power.

Lewchuk's Instrument

This section reviews the method used by Lewchuk to construct an instrument which was administered to a stratified random sample of industrial arts teachers in Alberta. The instrument consisted of two parts. The method of construction of each part is provided here and a sample of his complete instrument is given in APPENDIX B.

Part one of the instrument was based on Thurstone's classical matched pairs model. Thurstone (1926, 1927, 1931, 1951) maintained that the method of paired comparison or matched pairs could be used to measure attitudes, opinions or social values. Prior to Thurstone's work on the method of paired comparison there was no quantitative logic for handling the method of paired comparison to obtain measurement which satisfied the criterion of internal consistency. Therefore, through statistical manipulation, Thurstone (1931, p. 251)

devised the "law of comparative judgment" whereby the method of paired comparison or matched pairs could be validly used for measuring opinions or attitudes. Through this method, the opinion or attitude about a specific set of concepts could be measured in the following manner:

1. The concepts are either randomly listed or in some specific order. The concepts are then arranged in pairs so that every one of them is paired with every other one. The total number of pairs of concepts is determined by $n(n-1)/2$ where n is the number of concepts.
2. The pairs are administered to specific subjects who are required to respond to the pairs. The subjects are instructed to indicate which of the concepts in each pair they feel is their choice according to some stated criterion.
3. The number of subjects who chose each concept in each pair is tabulated and from these figures a matrix of proportions is established.
4. A table of scale values is established from the matrix of proportions. The scale values then show how the subjects responded to the set of concepts. The scale values can also be arranged in order of magnitude so that a ranking of the concepts can be achieved [Thurstone 1926, pp. 385-400].

With the above information in mind, Lewchuk listed his twenty-three characteristics of productive society in the order which appears in his chart (APPENDIX E). Then, each characteristic was paired with every other characteristic. For example, Power and Energy, the first characteristic listed in his chart, was paired with Natural Resources, then with Tools, and so on until it was paired with every other characteristic. This procedure was followed with each characteristic until all of the characteristics were paired with each other. The procedure yielded 253 pairs ($n(n-1)/2$). The pairs were then randomly ordered and constituted part one of the opinionnaire on productive society (APPENDIX B).

Part two of the instrument was based on the content of Lewchuk's chart (APPENDIX E). In the chart, each characteristic was described in each time period. Ideally, five descriptions should have been available for each characteristic, one description for each age of productive society; however, through the course of his library research, Lewchuk found that for several characteristics no distinction existed between certain ages. In such cases, Lewchuk combined the descriptions of these ages to form one description; therefore, less than five descriptions were available for some of the characteristics. For example, Power and Energy consisted of five descriptions corresponding to the five time periods but, Natural Resources, on the other hand, had only four because the atomic age and the cybernetics age descriptions combined to form a single description. For part two of the instrument, the different descriptions of each characteristic were formulated into specific response choices to a stem which referred to that particular characteristic. The stem was worded as follows:

When teaching the concept TOOLS as a characteristic of productive society in my industrial arts classes, it is my opinion that the content which emphasizes:

_____ is most important.
 _____ is least important.

There was one stem for each characteristic; moreover, the stem remained the same for each characteristic, only the characteristic was changed. Since there were twenty-three characteristics, there were also twenty-three stems and each was followed by the appropriate response choices.

It should be noted that the response choices were randomly ordered so that the respondents would not have a clue to the time periods. The following is a sample item in part two; and a complete sample of part two is provided in APPENDIX B. In the item, the respondent was required to insert the letter corresponding to the response which he felt was (1) the most important and (2) the least important, in the spaces provided.

When teaching the concept of Natural Resources as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important.
 _____ is least important.

- A. Development of forests, land, minerals and water resources
- B. Enforcing the conservation movement and more extensive use of research
- C. The use of coal and iron
- D. Use of land for agriculture and forests for structure and fuel

To conclude this section, it is important to note an important assumption which Lewchuk made in constructing this part of the instrument.

In his words:

No attempt was made to define the 23 characteristics of productive society for the respondents. It could be argued that with no definition being provided for each characteristic, each respondent might have a different connotation of that characteristic. It should be kept in mind, however, that the teacher training program for industrial arts teachers (while different at different universities) results in a commonality of interpretation for words such as materials, tools, services, etc., that would not be found if a group comprised of industrialists, mathematics teachers, etc., were sampled [p. 152].

Therefore, based upon the assumption that all industrial arts teachers should have the same connotation of each of the twenty three characteristics, no definitions for the twenty-three characteristics were provided in the instrument.

Summary of Lewchuk's study. To collect his data, Lewchuk constructed an instrument called the Opinionnaire on Productive Society. The instrument consisted of two parts. The first part was constructed on the basis of Thurstone's classical matched pairs model. In this part, the respondents chose from pairs of characteristics and indicated which characteristic in each pair they considered to be most important in teaching of industrial arts. The second part of the instrument was based on Lewchuk's chart which contained the descriptions of the characteristics in different time periods. In this part, the respondents indicated which description was most important when teaching industrial arts. The opinionnaire was administered to a stratified random sample of industrial arts teachers in the Province of Alberta.

Similarities Between Lewchuk, Blomgren, the Seventeenth Yearbook and the American Industry Project

It is important to note that although Lewchuk worked independently in structuring a description of productive society, three other researchers arrived at concepts which were similar to Lewchuk's characteristics of productive society. The three sources were: the American Industry Project (Gebhart 1968), Blomgren (1962), and the Seventeenth Yearbook of the American Council of Industrial Arts Teacher Education (1968). Although their purpose was to arrive at concepts which were descriptive of American industry while Lewchuk's purpose was to describe productive society, both they and Lewchuk were describing the same basic phenomenon. For example, Lewchuk (1969) maintained that, "productive society is dependent upon industry for its survival

and existence and industry must be organized in such a fashion as to effectively and efficiently meet man's wants and needs [p. 25]."

Blomgren on the other hand stated, "They will be concerned with the structure of industry and the identification of principles of industrial life [p. 22]." The Yearbook stated

The Yearbook will include man's evolution as a tool-making animal; the forms of production man has developed to supply him with material goods and services; the inter-relation of production and economic systems; and the unique social systems related to industry of organized labor and management [p. 29].

And, the American Industry Project stated the following

The American Industry Project is in the process of developing a secondary school curriculum which focuses upon the knowledges necessary to understand American industry. With the forces that American industry exerts in the molding of our society, it must be recognized as basic to the American way of life.

Therefore, all four were concerned with what Dubin (1958) called the world of work; and although the methods used to develop each of the works were different, there were many aspects of Blomgren's study, the Seventeenth Yearbook, Lewchuk's study and the American Industry Project which were similar.

The purpose of this section is to briefly illustrate that the methodology used by Blomgren, the Yearbook and the American Industry Project in describing American industry was different from that used by Lewchuk but, that all arrived at concepts of American industry which were similar to Lewchuk's characteristics of productive society.

Blomgren. The main purpose of Blomgren's study was "to investigate and evaluate the relative growth of selected groups of industrial arts education majors toward gaining an understanding of

American industry" (Blomgren, 1962, p. 15). Since there was no standard device for measuring an understanding of American industry, an outline of American industry was developed from which a test called the "Understanding American Industry test" was constructed.

Lewchuk structured his description of productive society through an extensive library search for relevant literature. Blomgren, however, began by consulting various authors in the disciplines of economics, engineering, history, management, psychology and sociology. He requested their assistance in suggesting authoritative literature which would assist in developing a description of American industry. From their suggested references, Blomgren established specific concepts which were the most descriptive and relevant aspects of American industry and constructed his outline.

An examination of Blomgren's outline and Lewchuk's chart (APPENDIX E) revealed that the majority of items in Blomgren's outline were located in the automation and cybernetics ages of Lewchuk's chart and a further examination of the outline and the chart revealed a relationship between Blomgren's historical periods and Lewchuk's ages. The relationship was:

BlomgrenColonial Period (to 1800)

1. Great dependence on human effort for power.
2. Handicraft industries in existence.

American Industrial Revolution (1800-1850)Period of Mechanization (1350-1950)

1. The invention of new forms of power such as electricity, the small electric motor and gas engines.

Second Industrial RevolutionLewchukModern Craft age (1400-1800)

1. Considerable unskilled labor required to perform physical tasks.
2. Skilled craftsmen predominant type of industry.

Machine age (1785-1880)

1. Lewchuk stated that the machine age resulted from the industrial revolution.

Power Age (1870-1950)

1. Wide use of electricity.
2. Internal combustion engine became popular.

Atomic age and Cybernetics age (1964-present)

Lewchuk stated that many writers feel that the factors of automation and cybernation could also be significant forms of an Industrial Revolution.

Regarding the relationship shown above, it was noted that Lewchuk's ages included specific historical periods of Blomgren's outline and it was also noted that the upper limits of Lewchuk's ages corresponded closely to the upper limits of Blomgren's historical periods. In addition to the above relationship many of Lewchuk's characteristics were located in the first three historical periods of the outline.

Because Blomgren was only interested in historical highlights and therefore did not give a detailed description of each period, the characteristics were difficult to identify; however, the following were evident: power and energy, tools, materials, work skills, inventions and developments, production systems, labor, management and personnel, economic structure, industrial organization and occupations. Therefore, it appeared that Lewchuk's work was all inclusive of Blomgren's and also contained a greater depth in the description of the world of work before the present date.

The Seventeenth Yearbook, edited by Luetkemeyer, shows a historical perspective of industry. The historical approach illustrates another method used in describing American industry, and an examination of the Seventeenth Yearbook revealed a similarity between its content and the content of Lewchuk's chart. Much of the content was written with regard to present day society; however, several chapters tended to be in agreement with Lewchuk's ages and also some of his characteristics. By title, four of the chapters were: Handicraft Technology, The Industrial Revolution, Machine Technology and Automation and Cybernation. These chapters described periods in history which were almost identical to Lewchuk's five ages; moreover, they also developed the following characteristics in a similar manner to Lewchuk: power and energy, resources, tools, work skills, inventions and developments, production systems, industrial organization, and economic structure. In addition to the four mentioned chapters, an examination of three other chapters revealed that many of the

remaining characteristics, of Lewchuk's chart, which were not included in the previous chapters were included here. The chapter titles were: Capitalism as an Economic System, The Role of Management and Organized Labor and the Production Worker. These chapters provided a historical development of the following characteristics: labor, management and personnel, economic structure, industrial organization, occupations, services, environment, and socialization. Consequently, although Lewchuk's chart and the Seventeenth Yearbook had different structures, they basically had the same content.

The American Industry Project illustrates a final method whereby concepts almost identical to Lewchuk's characteristics of productive society were arrived at in describing American industry. The Project's purpose was to identify a logical structure of generalized knowledges of industry which could be used to develop a curriculum of studies for secondary schools.

The starting point for the development of the structure involved the formulation of a definition of American industry. The Project (Gebhart, 1968) formally defined American industry as: "An institution in our society, which intending to make a monetary profit, applies knowledge and utilizes human and natural resources to produce goods or services to meet the needs of man [p. 3]."

With this definition in mind, the American Industry Project staff, the Project's participating teachers, and cooperating members of the faculty of Stout State University, developed an initial structure through seminar discussions. This structure was reviewed by

over two-hundred industrialists, labor leaders, and educators (Gebhart 1968). Their suggestions resulted in refining the original structure. Figure 1 is a sample of the final structure. An examination of Figure 1 reveals many concepts which are either identical or similar to Lewchuk's characteristics.

Summary

The contents of this chapter can be summarized in the following manner:

A review of professional writing indicates that a knowledge of productive society is important to everyone. On this basis, research to determine how the concept of productive society has been interpreted in the education sector is merited. One such piece of research was recently completed by Lewchuk. The purpose of his study was to determine how industrial arts teachers in Alberta interpreted the concept of productive society.

Lewchuk traced the development of productive society through the following five ages: the modern craft age, the machine age, the power age, the atomic age, and the cybernetics age by a review of literature in the disciplines of sociology, psychology, history, education and the physical sciences. He established twenty-three characteristics, examples of which are: power and energy, resources, labor, and socialization, which are a part of productive society in every age and the sum of all the characteristics constitutes a description of productive society. He used his description to construct a two-part instrument, called the Opinionnaire On Productive

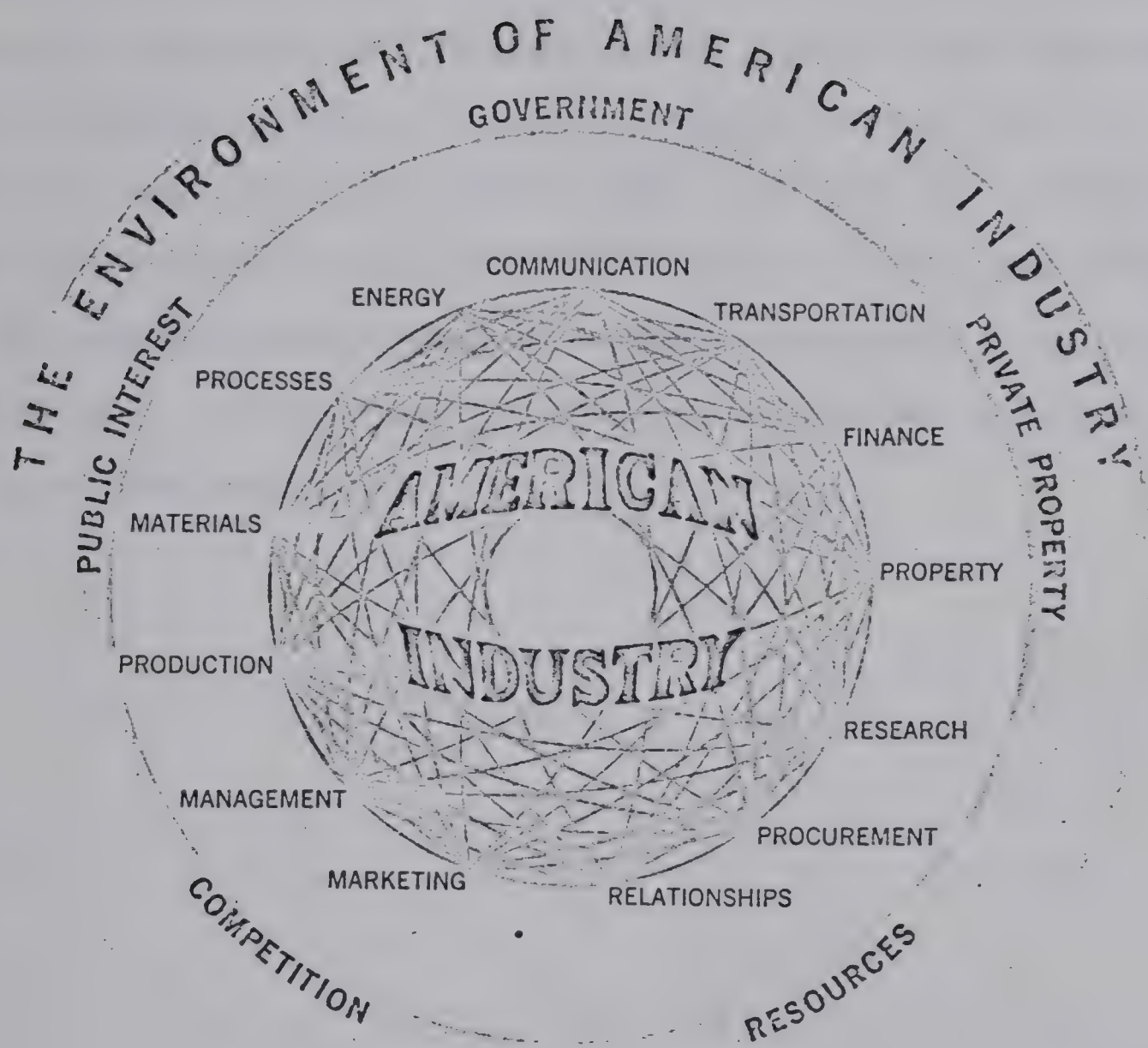


Figure 1

A Conceptual Structure of the
Knowledges Necessary to Understand
American Industry

(Gebhart 1968)

Society, which he administered to a stratified random sample of industrial arts teachers in Alberta.

Three other works: the American Industry Project, Blomgren's study and the Seventeenth Yearbook appear to be in agreement with Lewchuk's description of productive society. Each of the three works had a different purpose; therefore, the approach used by each to develop a description of productive society was different. However, each work described concepts of productive society which were similar to the characteristics of productive society established by Lewchuk. Consequently, Lewchuk's model of productive society was supported by at least three other works.

Chapter 3

INVESTIGATIVE PROCEDURES

The purpose of this study was to determine how junior high school students in Calgary Separate Schools interpreted the concept of productive society. In particular, the study attempted to determine how various groups of junior high school students ranked Lewchuk's twenty-three characteristics of productive society and also what ages of productive society were most familiar to the groups of students.

This chapter outlines the method of instrument construction, sampling technique, method of data collection, and data analysis.

The Instrument

As stated in chapter 2, Lewchuk constructed a two-part instrument entitled the Opinionnaire on Productive Society (APPENDIX B). Lewchuk's opinionnaire was not suitable to administer directly to junior high school students for the following reasons:

1. The instrument was designed for teachers and could not be applied to students because some words within the instrument were directed specifically to teachers. Furthermore, the reading level of the instrument was far above the junior high school reading level.
2. The twenty-three characteristics used in the instrument were not defined. Lewchuk did not want to define the twenty-three characteristics for his respondents because he assumed that

all industrial arts teachers had the same connotation of each of the twenty-three characteristics. His assumption, however, was not applicable to junior high school students because a possibility existed that some of the students did not know the precise meaning for some of the characteristics.

Consequently, a revised version of Lewchuk's opinionnaire was used in this study. It should be noted at this point that all revisions which were made to the opinionnaire were presented to Lewchuk for his approval. Any changes which were not acceptable to Lewchuk were revised until Lewchuk's complete approval was obtained. The revised opinionnaire appears in APPENDIX C.

A judgement committee consisting of two teachers of junior high school English, a junior high school librarian, and a complementary-one⁶ teacher was established to assist in revising the reading level and the vocabulary of the instrument. The two English teachers were selected because they were familiar with the vocabulary and the reading ability of junior high school students. Librarians are often required to select books and library materials which are suitable for junior high school students; therefore, a librarian was selected because she was able to pass judgement on the reading level of any material submitted to her. Finally, the complementary-one teacher

⁶Complementary-one is a special class of slow learners who have not been promoted from grade six to grade seven because they had specific problems, usually reading deficiencies, which would hinder their progress in grade seven.

was selected because of her ability in teaching students who, in many instances, were slow learners because of reading difficulties. This teacher was able to assist the committee in establishing a reading level which was low enough to accommodate any poor reader selected in the sample.

A booklet explaining the twenty-three characteristics of productive society. Upon examining Lewchuk's opinionnaire, the judgement committee and three professors from the Department of Industrial and Vocational Education at the University of Alberta, concluded that there was no guarantee that all students held the same connotation of the twenty-three characteristics of productive society or that all of the students would possess, in their repertoire, a suitable meaning for every characteristic. In other words, there was a possibility that each student responding to the instrument could have a different interpretation of each of the characteristics and thus, each student could answer the opinionnaire from a different point of view. Furthermore, guessing could be a major factor in responding to the opinionnaire if students did not know the precise meaning of a characteristic. Therefore it was decided that an explanation of each characteristic of productive society should be provided for the respondents. These explanations would serve as a common base from which the students could begin to complete the opinionnaire.

A booklet of explanations was established in two stages. First, a preliminary booklet explaining the twenty-three characteristics was constructed by the researcher. Each of the twenty-three explanations was either taken directly out of Lewchuk's thesis or derived from

definitions of terms obtained from The Intermediate Dictionary of Canadian English. The preliminary booklet of explanations was then submitted to the judgement committee for criticisms and suggestions regarding the vocabulary and the reading level. This committee did not pass judgement on the adequacy or the validity of each explanation. Each member of the committee first made individual criticisms, then, through a series of seminar discussions with the committee, the researcher arrived at what was considered to be an adequate booklet, in terms of vocabulary and reading level, explaining the twenty-three characteristics.

In the second stage, the booklet was submitted to Lewchuk for his approval regarding the adequacy and validity of the explanations. His comments and suggestions were utilized in making a final revision of the booklet. The booklet comprised one part of the revised instrument called The Student's Opinionnaire of Productive Society (APPENDIX C).

Part one of Lewchuk's opinionnaire (APPENDIX B) was based on Thurstone's classical matched pairs model. Two major changes were made in part one of Lewchuk's opinionnaire. First, several words in this part of Lewchuk's instrument were directed specifically to industrial arts teachers and, therefore, the instrument could not be administered to junior high school students. In addition, the judgement committee recommended that the instructions be changed because they were too complicated for junior high school students to follow. Part one was reworded to apply to junior high school students, the instructions were simplified, and then it was submitted to the judgement

committee for their comments and suggestions. Secondly, Lewchuk had made an error in pairing the characteristics. Four of the characteristics were paired twice while six were completely omitted. Therefore, the pairing of the characteristics was redone. The pairing was begun by listing the characteristics in the following order:

1. Power and energy
2. Natural resources
3. Tools
4. Materials
5. Work skills
6. Inventions and developments
7. Scientific developments
8. Production systems
9. Processes
10. Transportation
11. Communication information
12. Labor
13. Management and personnel
14. Economic structure
15. Industrial organization
16. Marketing
17. Planning and control
18. Training and education
19. Occupations
20. Services
21. Consumer products
22. Environment
23. Socialization

Characteristic number one (Power and energy) was then paired with characteristic number two (Natural resources), then with characteristic number three (Tools), and so on until it was paired with every other characteristic. Then in a similar fashion characteristic number two (Natural resources) was paired with characteristic number three, and so on. This procedure was continued until all of the characteristics were paired with each other. This yielded 253 pairs which were then randomly ordered to form the body of revised part one.

The revised part one was submitted to Lewchuk for his approval. His suggestions were used to further refine part one which was then incorporated as a part of the total revised instrument called The Student's Opinionnaire of Productive Society (APPENDIX C).

Part two of Lewchuk's opinionnaire (APPENDIX B). The major criticism made by the judgement committee regarding this part was that it was not worded to apply to junior high school students and that the vocabulary and the reading level were too high for junior high school students. Consequently, the instructions for part two were reworded to apply to junior high school students and the vocabulary and reading level of the body was restructured. Restructuring of the body resulted in changing the terminology in some instances and, at times, omitting some terms entirely. The procedure necessitated going back to chapter two of Lewchuk's thesis and determining, with the aid of The Intermediate Dictionary of Canadian English, simpler terminology which could be substituted for the terminology used in part two of Lewchuk's instrument. It should be noted that at no time was the content of Lewchuk's part two substituted with the researcher's own content. The emphasis was placed in changing the vocabulary and the reading level of the instrument and not its content. When a preliminary draft of a new part two was completed, it was presented to the judgement committee. Through seminar discussions with the committee, revisions were made in the preliminary draft. The revised draft was then presented to Lewchuk for approval. The approved draft then constituted the final part of The Student's

Opinionnaire of Productive Society (APPENDIX C).

Format of the new instrument. The revised instrument, called The Student's Opinionnaire of Productive Society, consisted of three individual sections: (1) a booklet explaining the twenty-three characteristics of productive society, (2) a booklet of Thurstone's matched pairs (Lewchuk's part one), and (3) a revised version of Lewchuk's part two. Each section consisted of a separate booklet containing its own instructions and each was printed on different colored paper. The booklets were not numbered in any sequence (e.g. part 1, part 2 or part A, part B).

The rationale for using the above format was as follows:

1. There were two reasons for constructing the instrument to consist of three individual booklets. First, it was suggested by the judgement committee that actual writing time might be lessened if the respondents were given the explanations of the twenty-three characteristics one to three days prior to the administration of the instrument. Secondly, the committee suggested that because the total instrument was quite lengthy, it could be administered in two sittings. Consequently, arranging the instrument into three individual booklets was necessary: one booklet for the definitions, a second booklet for the revised part one, and a third booklet for the revised part two.
2. The total instrument consisted of twenty-four pages. It was felt that students might become bored and tired of responding

to that many pages of white paper; therefore, different colored paper for each booklet was used to aid in overcoming monotony. Furthermore, it was hoped that the colored booklets would cause the pupil to believe that he or she was completing only two short opinionnaires rather than one extremely long one.

3. It was decided that if the booklets were not numbered in any sequence, the instrument would be more flexible, because either part of the actual opinionnaire could be responded to first. If the booklets were ordered, students might have felt that they had to complete part one before completing part two.

Population and Sample Selection

Before a sample could be selected, permission to use the junior high school students in Calgary Separate Schools as the population for the study had to be obtained. An interview was arranged with the Superintendent to explain the purpose and the scope of the study. The Superintendent granted conditional permission in writing (APPENDIX D) and advised that clearance for contact with school personnel had to be obtained from the Director of Education. The Director was contacted by letter (APPENDIX D); he passed the letter to the Coordinator of Secondary Education. The Coordinator, however, refused clearance until an instrument which could be reviewed by the Superintendent was provided (APPENDIX D). When a final copy of the instrument was available, it was presented to the Superintendent and an interview with the Coordinator was arranged. During this interview, final clearance was received to conduct the study during industrial arts and home economics

classes, and in addition, a list containing the names of schools and their principals was obtained. A letter (APPENDIX D) authorizing the study was sent to all junior high school principals by the Coordinator. Permission to conduct the study was granted with the following qualifications:

1. The principals of the schools involved had to consent to releasing their pupils.
2. The industrial arts and home economics consultants had to agree to give up their class time.
3. The industrial arts and home economics teachers had to agree to have their students removed from class.
4. The students involved had to consent.

After clearance was granted, telephone calls were made to the consultants and teachers involved to obtain their informal approval. Finally, interviews with the principals of the various schools were arranged and class lists were obtained from them at this time.

The population. At the time this study was undertaken there were nineteen junior high and elementary-junior high schools in the Calgary Separate School system. According to the January 1970 statistics, the total junior high school population was 4,698 students. These students comprised the population for the study.

The sample. The opinionnaire was administered to a stratified random sample of fifty students. The stratification and the number of students selected from each school is given in Table i below.

Table i

SCHOOLS WHOSE STUDENTS PARTICIPATED IN THE STUDY
AND THE NUMBER SELECTED FOR THE SAMPLE

School	No. of Junior High School Students in the School	No. of Students in the Sample
1. St. Matthew	366	4
2. St. Alphonsus	359	4
3. Brebeuf	353	4
4. St. Stephen	347	4
5. St. Augustine	311	3
6. St. Gregory	310	3
7. St. Margaret	291	3
8. St. Michael	261	3
9. St. Helena	258	3
10. St. James	230	2
11. Bishop Kidd	228	2
12. Assumption	198	2
13. St. Joseph Jr. High	192	2
14. Sacred Heart	165	2
15. Holy Cross	161	2
16. St. Peter	153	2
17. St. Mary's Elementary and Junior High	145	2
18. St. Anne	119	2
19. St. Bernadette	53	1
Total	4,698	50

When the number of students to be selected from each school was determined, the names of the junior high school students in each school were numbered. A table of random numbers was then used to select the students for the sample. A distribution of students used in the sample is given in Table ii below.

Table ii
A DISTRIBUTION OF STUDENTS
USED IN THE SAMPLE

Grade	Males in Sample	Females in Sample	Total
7	5	9	14
8	8	12	20
9	8	8	16
Total	21	29	50

All students agreed to participate; therefore, sampling was completed with the first sample.

The Pilot Study

A pilot study was conducted to further refine the instrument. A sample consisting of ten junior high school students was selected for the pilot study. The ten students were randomly selected from the population which remained after the sample used for the main study had been selected.

In the pilot study, the students were given the booklet of explanations three days in advance for pre-study. At this time they were told that they had been selected to take part in a study involving junior high school students and that they did not have to participate if they did not wish to. All agreed to participate and were given instructions regarding the booklet of explanations. In addition, they were also given an overview of the instrument and of the study in general.

On the fourth day, the students were assembled in a classroom to complete The Student's Opinionaire of Productive Society. The researcher began by reviewing the explanations of the twenty-three characteristics of productive society and then gave detailed instructions regarding the method of completing each part of the opinionaire. Since this was a pilot study, it was decided to administer both parts of the opinionaire in one sitting to determine the length of time required by students to complete the whole instrument. The students were told that they could begin working on whichever part they wished; however, they were cautioned that they had to complete both opinionaire booklets. They were also encouraged to refer to the booklet of explanations at any time during the sitting.

From the pilot study it was discovered that giving the booklet of explanations for pre-study and also giving a general overview of the study beforehand tended to motivate the students because all appeared enthusiastic and prepared to complete the opinionaire when the time came. Furthermore, no student required more than one hour to complete the entire opinionaire; therefore, two sittings were deemed not necessary to collect the data. Finally, the pilot study resulted in the following refinements being made to The Student's Opinionaire of Productive Society:

1. An explanation of Labor which had been overlooked in constructing the booklet was added to the booklet of definitions.
2. In the matched pairs section, thirty pairs had been left out in the pilot instrument; these were included in the final

instrument.

3. In the revised version of Lewchuk's part two, the following response choice was overlooked: The use of messengers and talking as the main method of communication. It was added to the final instrument.

A sample of the refined instrument is provided in APPENDIX C.

Administration of the Instrument

When revisions to the pilot instrument were completed, specific times were arranged with industrial arts teachers, home economics teachers, and principals to administer the instrument and to present the participants with the booklet of explanations in advance. It should be noted at this point that grade seven students did not take industrial arts or home economics; therefore, the instrument could not be administered to them during the industrial arts and home economics class time. To overcome this difficulty, each principal who had grade seven students participating in the study was contacted and requested to permit the researcher to administer the instrument to the grade seven students at some convenient time. All of the principals were very co-operative in this regard.

As in the pilot study, the students were presented with a booklet explaining the characteristics three days in advance. At this time the students were given instructions regarding the explanations and an overview was given of the instrument and of the study in general. On the fourth day, the instrument was administered and

because no student required more than an hour to complete the whole instrument in the pilot, it was decided to administer it in one sitting. The researcher began with a review of the explanations of the twenty-three characteristics of productive society, then detailed instructions were given regarding the method for completing each part of the instrument. In addition, the students were told that they could begin working on whichever part they wished; however, they were cautioned that they had to complete both opinionaire booklets. They were also encouraged to refer to the booklet of explanations at any time during the sitting. Finally, when a student completed one part of the opinionaire he or she was given a ten minute rest break before beginning the second part.

Of the fifty students who were selected for the sample, fifty completed the opinionaire. Fortunately, only one student was absent from school on the day that the instrument was being administered to his school. This student was contacted at a later date to complete the instrument.

Data Analysis

The data obtained from each part of The Student's Opinionaire of Productive Society were analyzed separately. No attempt was made to combine the data obtained from each part and then analyzing the combined data. This section presents an explanation of how the data for each part were analyzed.

Data analysis for the first part of The Student's Opinionaire of Productive Society. This part of the instrument was based upon Thurstone's classical matched pairs model and was utilized to determine how specific groups of junior high school students ranked, in order of importance, the twenty-three characteristics of productive society.

The raw data obtained from the instrument were sorted into the following groups: total group, male, female, industrial arts, and non-industrial arts. The sorted raw data were then analyzed according to the experimental procedures for the method of paired comparisons (Torgerson, 1958, pp. 159-179). An outline of the procedure used to analyze the data for each group is given below. First, the raw data for each group were arranged in the form of a raw frequency matrix which showed the number of times each characteristic was judged to be more important than each other characteristic. Table 1 is an example of such a matrix. In the raw frequency matrix, any characteristic which appeared as a column was denoted as a J stimulus and any characteristic which appeared as a row was denoted as an I stimulus. The matrix therefore, showed the number of times any stimulus J was preferred over any stimulus I. For example, in Table 1 the characteristic tools which appears at the top of the matrix (stimulus J) was preferred 34 times over the characteristic materials and similarly the characteristic tools was preferred 17 times over the characteristic socialization.

TABLE 1

RAW FREQUENCY MATRIX SHOWING THE NUMBER OF TIMES A CHARACTERISTIC WHICH APPEARS IN A COLUMN IS PREFERRED TO A CHARACTERISTIC WHICH APPEARS IN A ROW

1	2																							
	Communication Information	Consumer Products	Economic Structure	Environment	Industrial Organization	Inventions and Development	Labor	Management and Personnel	Marketing	Materials	Natural Resources	Occupations	Planning and Control	Power and Energy	Processes	Production Systems	Scientific Development	Service Industries	Socialization	Tools	Training and Education	Transportation	Work Skills	
	Communication Information	***	19	36	30	9	23	13	27	34	30	34	23	26	39	28	27	31	24	36	25	19	2	25
	Consumer Products	31	***	13	33	39	32	26	30	26	19	22	23	34	34	23	25	26	26	26	19	43	34	37
	Economic Structure	14	37	***	20	30	7	15	32	32	23	13	16	26	27	28	36	18	13	11	38	21	37	29
	Environment	20	17	30	***	19	22	21	20	26	29	31	32	17	36	11	28	27	30	12	23	38	19	23
	Industrial Organization	41	11	20	31	***	7	36	23	34	12	17	19	19	21	17	25	27	20	22	28	16	19	32
	Inventions and Development	27	18	43	28	43	***	18	17	24	32	18	31	17	29	19	16	20	30	32	26	17	13	33
	Labor	37	24	35	29	14	32	***	16	27	23	22	18	34	31	33	24	24	16	36	27	8	22	32
	Management and Personnel	23	20	18	30	27	33	34	***	13	17	36	30	19	27	24	25	35	12	19	24	24	30	33
	Marketing	16	24	18	24	16	26	23	37	***	7	22	30	38	23	20	23	33	30	11	27	19	9	40
	Materials	20	31	27	21	38	18	27	33	43	***	38	14	17	31	26	13	23	14	21	34	36	25	19
	Natural Resources	16	28	37	19	33	32	28	14	28	12	***	22	25	13	26	21	28	16	19	43	23	16	16
	Occupations	27	27	34	18	31	19	32	20	20	36	28	***	20	31	19	23	27	21	24	29	15	19	22
	Planning and Control	24	16	24	33	31	33	16	31	12	33	25	30	***	19	32	28	23	31	28	21	22	34	26
	Power and Energy	11	16	23	14	29	21	19	23	27	19	37	19	31	***	22	23	20	19	19	32	28	20	30
	Processes	22	27	22	39	33	31	17	26	30	24	24	31	18	28	***	28	33	36	43	22	30	29	8
	Production Systems	23	25	14	22	25	34	26	25	27	37	29	27	22	27	22	***	33	44	34	20	24	17	24
	Scientific Development	19	24	32	23	23	30	26	15	17	27	22	23	27	30	17	17	***	16	18	38	12	25	27
	Service Industries	26	24	37	20	30	20	34	38	20	36	34	29	19	31	14	6	34	***	8	31	34	23	36
	Socialization	14	24	39	38	28	18	14	31	39	29	31	26	22	31	7	16	32	42	***	17	36	15	26
	Tools	27	31	12	27	22	24	23	26	23	16	7	21	29	18	28	30	12	19	33	***	43	40	28
	Training and Education	31	7	29	12	34	33	42	26	31	14	27	35	28	22	20	26	38	16	14	7	***	35	12
	Transportation	48	16	13	31	31	37	28	20	41	25	34	31	16	30	21	33	25	27	35	10	15	***	41
Work Skills	27	13	21	27	18	17	18	17	10	31	34	28	24	20	42	26	23	14	24	22	38	9	***	

From the raw frequency matrix, a proportion matrix was constructed for each group. The proportional matrix, which was similar in construction to the raw frequency matrix, indicated the proportion of times stimulus J was preferred to stimulus I. For example, in Table 2, a proportion matrix, the characteristic tools (J stimulus) was preferred 0.68 more times than the characteristic materials (I stimulus) and similarly, the characteristic tools was preferred 0.34 more times than socialization.

Each proportion matrix was converted to a matrix of Z values. Table 3 is an example of a matrix of Z values. Each cell in the matrix of Z values contained an estimate of the difference between scale values of the two characteristics depicted by that cell. These estimated differences were expressed in standardized units which had a mean of zero and a standard deviation of one. For example, in Table 3 the standardized difference in scale value between the characteristic tools (J stimulus) and the characteristic materials (I stimulus) was 0.5 and the standardized difference in scale value between tools and socialization was -0.4.

The Gauss Conversion was then applied to the Z matrix for each group and scale values were generated for the twenty-three characteristics in each group. Finally, the characteristics for each group were ranked from the highest scale value to the lowest scale value.

TABLE 2

MATRIX OF PROPORTIONS

I	J	Matrix of Proportions																						
		Communication Information	Consumer Products	Economic Structure	Environment	Industrial Organization	Inventions and Development	Labor	Management and Personnel	Marketing	Materials	Natural Resources	Occupations	Planning and Control	Power and Energy	Processes	Production Systems	Scientific Development	Service Industries	Socialization	Tools	Training and Education	Transportation	Work Skills
	Communication Information	0.50	0.38	0.72	0.60	0.18	0.46	0.26	0.54	0.68	0.60	0.68	0.46	0.52	0.78	0.56	0.54	0.62	0.48	0.72	0.46	0.38	0.04	0.46
	Consumer Products	0.62	0.50	0.26	0.66	0.78	0.64	0.52	0.60	0.52	0.38	0.44	0.46	0.68	0.68	0.46	0.50	0.52	0.52	0.52	0.38	0.86	0.68	0.74
	Economic Structure	0.28	0.74	0.50	0.40	0.60	0.14	0.30	0.64	0.64	0.46	0.26	0.32	0.52	0.54	0.56	0.72	0.36	0.26	0.22	0.76	0.42	0.74	0.58
	Environment	0.40	0.34	0.60	0.50	0.38	0.44	0.42	0.40	0.52	0.58	0.62	0.64	0.34	0.72	0.22	0.56	0.54	0.60	0.24	0.46	0.76	0.38	0.46
	Industrial Organization	0.82	0.22	0.40	0.62	0.50	0.14	0.72	0.46	0.68	0.24	0.34	0.38	0.38	0.42	0.34	0.50	0.54	0.40	0.44	0.56	0.32	0.58	0.61
	Inventions and Development	0.54	0.36	0.86	0.56	0.86	0.50	0.36	0.34	0.48	0.64	0.36	0.62	0.34	0.58	0.38	0.32	0.40	0.60	0.64	0.52	0.34	0.26	0.66
	Labor	0.74	0.48	0.70	0.58	0.28	0.64	0.50	0.32	0.54	0.46	0.44	0.36	0.68	0.62	0.66	0.48	0.48	0.32	0.72	0.54	0.16	0.41	0.64
	Management and Personnel	0.46	0.40	0.36	0.60	0.54	0.66	0.68	0.50	0.26	0.34	0.72	0.60	0.38	0.54	0.48	0.50	0.70	0.24	0.38	0.48	0.48	0.60	0.66
	Marketing	0.32	0.48	0.36	0.48	0.32	0.52	0.46	0.74	0.50	0.14	0.44	0.60	0.76	0.46	0.40	0.46	0.66	0.60	0.22	0.54	0.38	0.18	0.80
	Materials	0.40	0.62	0.54	0.42	0.76	0.36	0.54	0.66	0.86	0.50	0.76	0.28	0.34	0.62	0.52	0.26	0.46	0.28	0.42	0.68	0.72	0.50	0.38
	Natural Resources	0.32	0.56	0.74	0.38	0.66	0.64	0.56	0.28	0.56	0.24	0.50	0.44	0.50	0.26	0.52	0.42	0.56	0.32	0.38	0.86	0.46	0.32	0.32
	Occupations	0.54	0.54	0.68	0.36	0.62	0.38	0.64	0.40	0.40	0.72	0.56	0.50	0.40	0.62	0.38	0.46	0.51	0.42	0.48	0.58	0.30	0.38	0.11
	Planning and Control	0.48	0.32	0.48	0.66	0.62	0.66	0.32	0.62	0.24	0.66	0.50	0.60	0.50	0.38	0.64	0.56	0.46	0.62	0.56	0.42	0.44	0.68	0.52
	Power and Energy	0.22	0.32	0.46	0.28	0.58	0.42	0.38	0.46	0.54	0.38	0.74	0.38	0.62	0.50	0.44	0.46	0.40	0.38	0.38	0.64	0.56	0.40	0.60
	Processes	0.44	0.54	0.44	0.78	0.66	0.62	0.34	0.52	0.60	0.48	0.48	0.62	0.36	0.56	0.50	0.56	0.66	0.72	0.86	0.44	0.60	0.58	0.16
	Production Systems	0.46	0.50	0.28	0.44	0.50	0.68	0.52	0.50	0.54	0.74	0.58	0.54	0.44	0.54	0.44	0.50	0.66	0.88	0.68	0.40	0.48	0.34	0.48
	Scientific Development	0.38	0.48	0.64	0.46	0.46	0.60	0.52	0.30	0.34	0.54	0.44	0.46	0.54	0.60	0.34	0.34	0.50	0.32	0.36	0.76	0.24	0.50	0.51
	Service Industries	0.52	0.48	0.74	0.40	0.60	0.40	0.68	0.76	0.40	0.72	0.68	0.58	0.38	0.62	0.28	0.12	0.68	0.50	0.16	0.62	0.68	0.46	0.72
	Socialization	0.28	0.48	0.78	0.76	0.56	0.36	0.28	0.62	0.78	0.58	0.62	0.52	0.44	0.62	0.14	0.32	0.64	0.84	0.50	0.34	0.72	0.30	0.52
	Tools	0.54	0.62	0.24	0.54	0.44	0.48	0.46	0.52	0.46	0.32	0.14	0.42	0.58	0.36	0.56	0.60	0.24	0.38	0.66	0.50	0.86	0.80	0.56
	Training and Education	0.62	0.14	0.58	0.24	0.68	0.66	0.84	0.52	0.62	0.28	0.54	0.70	0.56	0.44	0.40	0.52	0.76	0.32	0.28	0.14	0.50	0.70	0.24
	Transportation	0.96	0.32	0.26	0.62	0.62	0.74	0.56	0.40	0.82	0.50	0.68	0.62	0.32	0.60	0.42	0.66	0.50	0.54	0.70	0.20	0.30	0.50	0.82
	Work Skills	0.54	0.26	0.42	0.54	0.36	0.34	0.36	0.34	0.20	0.62	0.68	0.56	0.48	0.40	0.84	0.52	0.46	0.28	0.48	0.44	0.76	0.18	0.50

TABLE 3
MATRIX OF Z VALUES

I	Communication Information	Consumer Products	Economic Structure	Environment	Industrial Organization	Inventions and Development	Labor	Management and Personnel	Marketing	Materials	Natural Resources	Occupations	Planning and Control	Power and Energy	Processes	Production Systems	Scientific Development	Service Industries	Socialization	Tools	Training and Education	Transportation	Work Skills
Communication Information	0.0	-0.3	0.6	0.3	-0.9	-0.1	-0.6	0.1	0.5	0.3	0.5	-0.1	0.1	0.8	0.2	0.1	0.3	-0.1	0.6	-0.1	-0.5	-1.8	-0.1
Consumer Products	0.3	0.0	-0.6	0.4	0.8	0.4	0.1	0.3	0.1	-0.3	-0.2	-0.1	0.5	0.5	-0.1	0.0	0.1	0.1	0.1	-0.3	1.1	0.5	0.6
Economic Structure	-0.6	0.6	0.0	-0.3	0.3	-1.1	-0.5	0.4	0.4	-0.1	-0.6	-0.5	0.1	0.1	0.2	0.6	-0.4	-0.6	-0.8	0.7	-0.2	0.6	0.2
Environment	-0.3	-0.4	0.3	0.0	-0.3	-0.2	-0.2	-0.3	0.1	0.2	0.3	0.4	-0.4	0.6	-0.8	0.2	0.1	0.3	-0.7	-0.1	0.7	-0.3	-0.1
Industrial Organization	0.9	-0.8	-0.3	0.3	0.0	-1.1	0.6	-0.1	0.5	-0.7	-0.4	-0.3	-0.3	-0.2	-0.4	0.0	0.1	-0.3	-0.2	0.2	-0.5	-0.3	0.4
Inventions and Development	0.1	-0.4	1.1	0.2	1.1	0.0	-0.4	-0.4	-0.1	0.4	-0.4	0.3	-0.4	0.2	-0.3	-0.5	-0.3	0.3	0.4	0.1	-0.4	-0.6	0.4
Labor	0.6	-0.1	0.5	0.2	-0.6	0.4	0.0	-0.5	0.1	-0.1	-0.2	-0.4	0.5	0.3	0.4	-0.1	-0.1	-0.5	0.6	0.1	-1.0	-0.2	0.4
Management and Personnel	-0.1	-0.3	-0.4	0.3	0.1	0.4	0.5	0.0	-0.6	-0.4	0.6	0.3	-0.3	0.1	-0.1	0.0	0.5	-0.7	-0.3	-0.1	-0.1	0.3	0.4
Marketing	-0.5	-0.1	-0.4	-0.1	-0.5	0.1	-0.1	0.6	0.0	-1.1	-0.2	0.3	0.7	-0.1	-0.3	-0.1	0.4	0.3	-0.8	0.1	-0.3	-0.9	0.8
Materials	-0.3	0.3	0.1	-0.2	0.7	-0.4	0.1	0.4	1.1	0.0	0.7	-0.6	-0.4	0.3	0.1	-0.6	-0.1	-0.6	-0.2	0.5	0.6	0.0	-0.3
Natural Resources	-0.5	0.2	0.6	-0.3	0.4	0.4	0.2	-0.6	0.2	-0.7	0.0	-0.2	0.0	-0.6	0.1	-0.2	0.2	-0.5	-0.3	1.1	-0.1	-0.5	-0.5
Occupations	0.1	0.1	0.5	-0.4	0.3	-0.3	0.4	-0.3	-0.3	0.6	0.2	0.0	-0.3	0.3	-0.3	-0.1	0.1	-0.2	-0.1	0.2	-0.5	-0.3	-0.2
Planning and Control	-0.1	-0.5	-0.1	0.4	0.3	0.4	-0.5	0.3	-0.7	0.4	0.0	0.3	0.0	-0.3	0.4	0.2	-0.1	0.3	0.2	-0.2	-0.2	0.5	0.1
Power and Energy	-0.8	-0.5	-0.1	-0.6	0.2	-0.2	-0.3	-0.1	0.1	-0.3	0.6	-0.3	0.3	0.0	-0.2	-0.1	-0.3	-0.3	-0.3	0.4	0.2	-0.3	0.3
Processes	-0.2	0.1	-0.2	0.8	0.4	0.3	-0.4	0.1	0.3	-0.1	-0.1	0.3	-0.4	0.2	0.0	0.2	0.4	0.6	1.1	-0.2	0.3	0.2	-1.0
Production Systems	-0.1	0.0	-0.6	-0.2	0.0	0.5	0.1	0.0	0.1	0.6	0.2	0.1	-0.2	0.1	-0.2	0.0	0.4	1.2	0.5	-0.3	-0.1	-0.4	-0.1
Scientific Development	-0.3	-0.1	0.4	-0.1	-0.1	0.3	0.1	-0.5	-0.4	0.1	-0.2	-0.1	0.1	0.3	-0.4	-0.4	0.0	-0.5	-0.4	0.7	-0.7	0.0	0.1
Service Industries	0.1	-0.1	0.6	-0.3	0.3	-0.3	0.5	0.7	-0.3	0.6	0.5	0.2	-0.3	0.3	-0.6	-1.2	0.5	0.0	-1.0	0.3	0.5	-0.1	0.6
Socialization	-0.6	-0.1	0.8	0.7	0.2	-0.4	-0.6	0.3	0.8	0.2	0.3	0.1	-0.2	0.3	-1.1	-0.5	0.4	1.0	0.0	-0.4	0.6	-0.5	0.1
Tools	0.1	0.3	-0.7	0.1	-0.2	-0.1	-0.1	0.1	-0.1	-0.5	-1.1	-0.2	0.2	-0.4	0.2	0.3	-0.7	-0.3	0.4	0.0	1.1	0.8	0.2
Training and Education	0.3	-1.1	0.2	-0.7	0.5	0.4	1.0	0.1	0.3	-0.6	0.1	0.5	0.2	-0.2	-0.3	0.1	0.7	-0.5	-0.6	-1.1	0.0	0.5	-0.7
Transportation	1.8	-0.5	-0.6	0.3	0.3	0.6	0.2	-0.3	0.9	0.0	0.5	0.3	-0.5	0.3	-0.2	0.4	0.0	0.1	0.5	-0.8	-0.5	0.0	0.9
Work Skills	0.1	-0.6	-0.2	0.1	-0.4	-0.4	-0.4	-0.4	-0.8	0.3	0.5	0.2	-0.1	-0.3	1.0	0.1	-0.1	-0.6	-0.1	-0.2	0.7	-0.9	0.0

Data analysis for the second part of The Student's Opinionaire of Productive Society. This part of the instrument was designed to determine the age of productive society which specific groups of junior high school students considered to be the most important for the twenty-three characteristics of productive society and also which age the various groups considered to be the least important. The data were analyzed in a manner identical to the method used by Lewchuk. Lewchuk based this part of his instrument on his chart of productive society (APPENDIX E). The chart contained specific facts about each characteristic of productive society during specific time periods or ages and the questions in the instrument were based upon these facts. Each question contained several phrases with regard to a specific characteristic of productive society. Each of the phrases in a question was descriptive of the characteristic in the question during a specific age or time period. For example, question number one (APPENDIX C) contained four phrases regarding the characteristic natural resources. The first phrase: The increased use of forests, minerals and water resources, was descriptive of natural resources during the power age. The second phrase: The use of research to find ways of using natural resources so that they will not be wasted, was descriptive of natural resources during the atomic and cybernetics ages. The third phrase: The use of coal and iron, was descriptive of natural resources during the machine age. The fourth phrase: The use of land for farming and the use of forests for fuel and building materials, was descriptive of natural resources during the modern

craft age.

The respondents were required to make two decisions:

1. To choose which phrase about a particular characteristic of productive society was most important in our type of productive society.
2. To choose which phrase about a particular characteristic of productive society was least important in our type of productive society.

By deciding which phrase about a specific characteristic of productive society was most important and which phrase was least important, the respondents indicated which age of productive society they considered to be most important and which age they considered to be least important for that particular characteristic.

The data were sorted into the following groups: total group, male, female, industrial arts, and non-industrial arts. For each group, the data were arranged in tabular form. The tables, which were identical in construction to Lewchuk's tables, showed a frequency count of what age the respondents in a particular group chose to be most important for each characteristic or, they showed a frequency count of what age the respondents chose to be the least important for each characteristic.

Analysis of the data consisted of examining the tables for evident trends which would have indicated that the respondents in a particular group favored a specific age of productive society as being either most important or least important.

Summary

The instrument used to gather data for this study was obtained by administering a revised version of Lewchuk's Opinionnaire on Productive Society. Revision to Lewchuk's instrument consisted of:

1. Rewording the instrument to apply to students rather than teachers.
2. Providing explanations for the twenty-three characteristics of productive society.
3. Lowering the vocabulary and the reading level of the instrument to a junior high school level.

To assist in making the revisions, a judgement committee consisting of two junior high school teachers of English, a librarian, and a complementary-one teacher was selected. This committee passed judgement on the appropriateness of the reading level and the vocabulary. All of the revisions were submitted to Lewchuk for his approval. The revised instrument was called The Student's Opinionnaire of Productive Society. It was comprised of three parts, a booklet explaining the twenty-three characteristics of productive society, a booklet of matched pairs (Lewchuk's part one), and a revised version of Lewchuk's part two. The three booklets were printed on different colored paper and each contained its own instructions. To refine the instrument, a pilot study was conducted. A pilot sample of ten students was selected from the population which remained after the sample for the main study had been selected. The final draft of the instrument was administered to a stratified random sample of fifty junior high school

students from the Calgary Separate School system.

The data obtained from each part of the instrument were analyzed separately. For the matched pairs section, the data were analyzed according to the experimental procedures for the method of paired comparisons. For the second part of the instrument, the data were analyzed in a manner identical to the method used by Lewchuk.

Chapter 4

THE RESEARCH FINDINGS

Chapter 4 contains two categories of findings; the findings related to part one of the opinionnaire (Thurstone's matched pairs) and, the findings related to part two of the opinionnaire (most and least important ages of productive society).

Findings Related to Part One of The Student's Opinionnaire of Productive Society

Part one of the opinionnaire was designed to determine how specific groups of junior high school students ranked, in order of importance, twenty-three characteristics of productive society. Table 4 presents a total picture of how each of the groups ranked twenty-three characteristics. In Table 4, the ranking for each group was arranged from the most important characteristic to the least important characteristic. For example, the total group ranked the twenty-three characteristics as follows:

1. Industrial Organization
2. Power and Energy
3. Work Skills
4. Scientific Development
5. Marketing
6. Natural Resources
7. Economic Structure
8. Environment
9. Training and Education
10. Tools
11. Occupations
12. Communication Information
13. Management and Personnel
14. Inventions and Development
15. Labor

TABLE 4

RANK ORDER OF THE 23 CHARACTERISTICS OF PRODUCTIVE SOCIETY
AS ASSIGNED BY FIVE GROUPS OF JUNIOR HIGH SCHOOL STUDENTS

Male (n=22)		Female (n=28)		Industrial Arts (n=22)		Non-Industrial Arts (n=20)		Total Group (n=50)	
Rank Order	Scale Value	Rank Order	Scale Value	Rank Order	Scale Value	Rank Order	Scale Value	Rank Order	Scale Value
Work Skills	1.752	Power and Energy	2.066	Work Skills	1.681	Power and Energy	1.884	Industrial Organization	1.501
Environment	1.581	Industrial Organization	1.405	Industrial Organization	1.496	Occupations	1.186	Power and Energy	1.316
Scientific Development	1.387	Marketing	1.101	Environment	1.239	Industrial Organization	1.153	Work Skills	1.295
Industrial Organization	1.242	Natural Resources	0.930	Scientific Development	1.158	Marketing	0.993	Scientific Development	1.149
Economic Structure	1.086	Tools	0.712	Economic Structure	1.028	Scientific Development	0.910	Marketing	1.008
Training and Education	0.905	Scientific Development	0.624	Marketing	0.913	Natural Resources	0.762	Natural Resources	0.906
Marketing	0.628	Work Skills	0.561	Training and Education	0.887	Work Skills	0.602	Economic Structure	0.833
Natural Resources	0.582	Economic Structure	0.435	Natural Resources	0.884	Economic Structure	0.539	Environment	0.533
Power and Energy	0.118	Inventions and Development	0.434	Tools	0.639	Management and Personnel	0.470	Training and Education	0.432
Communication Information	0.052	Occupations	0.315	Power and Energy	0.589	Inventions and Development	0.439	Tools	0.306
Labor	0.045	Planning and Control	0.295	Planning and Control	-0.270	Training and Education	0.013	Occupations	0.205
Occupations	-0.004	Communication Information	0.173	Communication Information	-0.288	Service Industries	0.011	Communication Information	0.151
Management and Personnel	-0.031	Management and Personnel	-0.054	Labor	-0.481	Tools	0.007	Management and Personnel	-0.066
Tools	-0.240	Training and Education	-0.127	Management and Personnel	-0.502	Labor	-0.125	Inventions and Development	-0.169
Service Industries	-0.431	Materials	-0.366	Processes	-0.630	Materials	-0.317	Labor	-0.333
Processes	-0.587	Socialization	-0.483	Socialization	-0.666	Environment	-0.334	Planning and Control	-0.571
Materials	-0.740	Production Systems	-0.491	Inventions and Development	-0.701	Communication Information	-0.336	Materials	-0.620
Socialization	-0.762	Environment	-0.537	Occupations	-0.751	Socialization	-0.539	Socialization	-0.710
Inventions and Development	-0.853	Labor	-0.548	Transportation	-0.832	Planning and Control	-0.593	Service Industries	-0.808
Consumer Products	-1.024	Service Industries	-0.904	Materials	-1.034	Production Systems	-0.869	Production Systems	-0.959
Production Systems	-1.225	Transportation	-1.313	Production Systems	-1.076	Transportation	-1.786	Processes	-1.431
Planning and Control	-1.448	Processes	-1.817	Consumer Products	-1.639	Processes	-1.886	Transportation	-1.926
Transportation	-2.031	Consumer Products	-2.411	Service Industries	-1.644	Consumer Products	-2.185	Consumer Products	-2.043

16. Planning and Control
17. Materials
18. Socialization
19. Service Industries
20. Production Systems
21. Processes
22. Transportation
23. Consumer Products

The total group therefore, ranked industrial organization as the most important characteristic of productive society and consumer products as the least important.

Table 4 also shows the scale values assigned to the characteristics by each group. The scale values indicated that each group placed a high emphasis on certain characteristics (+1 or higher scale value) and very little emphasis on others (-1 or less scale value). For example, in the column headed "Male" the most important characteristic was work skills and had a scale value of 1.752. The least important characteristic in the same column was transportation with a scale value of -2.031. Note from the scale values in Table 4 that the industrial arts group ranked work skills and industrial organization as the two most important characteristics of productive society. Conversely, the same group ranked occupations as eighteenth in importance and materials, production systems and consumer products as three of the least important characteristics of productive society.

An examination of Table 4 indicates that the groups were not in complete agreement with regard to a specific order in ranking twenty-three characteristics of productive society. Each group ranked the characteristics differently. However, although the groups were not in agreement with regard to a specific order in ranking the

twenty-three characteristics some agreement in the ranking was indicated near the center of Table 4. All groups except the non-industrial arts group, ranked communication information as either tenth or twelfth in order of importance. The same groups also ranked management and personnel as either thirteenth or fourteenth in order of importance. In addition, the scale values in Table 4 indicated that the groups partially agreed upon the emphasis placed on some of the characteristics. Industrial organization received high scale values in all of the groups. In addition, at least three groups placed a high emphasis on power and energy, work skills and scientific development. Consumer products on the other hand, received low scale values in all of the groups. Transportation received low emphasis in all except the industrial arts group. Finally, the total group, the non-industrial arts group, and the female group all emphasized processes, consumer products, and transportation as the three least important characteristics of productive society.

Table 5 is a rank order correlation matrix. It shows the degree of relationship that exists between the groups in terms of how the groups ranked the twenty-three characteristics of productive society. The matrix was obtained by executing a Spearman's Rank Order correlation between each of the groups. Table 5 shows a high correlation value between the male group and the industrial arts group. In other words, the degree of relatedness or the similarity in the way the students in these groups ranked the various characteristics of productive society was high. High correlation values were also indicated between the total group and each of the other four groups. The lowest correlation value

TABLE 5
SPEARMAN'S RANK ORDER CORRELATION VALUES
FOR GROUPS OF JUNIOR HIGH SCHOOL STUDENTS
IN CALGARY SEPARATE SCHOOLS

	Male (n = 22)	Female (n = 28)	Industrial Arts (n=22)	Non-Industrial Arts (n = 28)	Total Group (n = 50)
Male	1	.497	.851 ^a	.667 ^a	.867 ^a
Female		1	.648 ^a	.845 ^a	.873 ^a
Industrial Arts			1	.523	.866 ^a
Non-Industrial Arts				1	.841 ^a
Total Group					1

^aCorrelation significant at the .01 level.⁷

was indicated between the male group and the female. This correlation value appeared not to be significant at the .01 level of confidence. Note from Table 5, that although the correlation value between the female group and the industrial arts group is low, the correlation value was still significant at the .01 level of confidence.

⁷This .01 confidence level was obtained from Interpreting Education Research (Miller and Galfo 1965, p. 354).

Findings Related to Part Two of
The Student's Opinionaire of Productive Society

Part two of the opinionaire was designed to determine which of five ages of productive society was considered, by specific groups of junior high school students, to be the most important for twenty-three characteristics of productive society. Part two was also designed to determine which of five ages of productive society was considered to be the least important for twenty-three characteristics of productive society. Table 6 gives a frequency count of what the respondents in the total group chose to be the most important age of productive society. For example, Table 6 shows that for natural resources, nine respondents chose the modern craft age as being most important, three chose the machine age, sixteen chose the power age, and twenty-two chose the atomic and cybernetics ages combined as being most important. Conversely, Table 7 gives a frequency count of what the respondents in the total group chose to be the least important age of productive society. For example, Table 7 shows that for communication information, five respondents chose the modern craft age as being least important, two selected the machine age, nineteen chose the power age, four selected the atomic age, and twenty chose the cybernetics age as being the least important. Any blocked out sections in the tables indicates that no response was possible for that particular age or time period.

An examination of Tables 6 and 7 reveals that the frequency of responses for the total group was varied and unpredictable. In other words, there was no evident trend which would have indicated one

TABLE 6

FREQUENCY OF RESPONDENTS' CHOICE FOR THE MOST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(TOTAL GROUP) *

*n = 50	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	9		3		16		22	
Management & Personnel	6			12			32	
Communication Information	0		11		7	17		15
Materials	2		6		2	19		21
Socialization	6		6		15		23	
Production Systems	1		2		10	18		19
Work Skills	5		1		10	21		13
Training & Education	1		18		7	6		18
Marketing	6		3		19		22	
Labor	3			4			43	
Power & Energy	8		1		15	9		17
Inventions & Development	3		5		14		28	
Industrial Organization		6			8		36	
Planning & Control		9			29		12	
Tools	7		6		14	16		7
Processes	9		9		10		22	
Scientific Development		1			21		28	
Consumer Products		11			27		12	
Occupations		4			30		16	
Transportation	4		1		10	18		17
Services		3			6		41	
Environment	21		12		9	8		
Economic Structure	5		4		13	14		14

TABLE 7

FREQUENCY OF RESPONDENTS' CHOICE FOR THE LEAST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(TOTAL GROUP)*

*n = 50	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	10		29		9		2	
Management & Personnel	26						8	
Communication Information	5		2		19	4		20
Materials	16		10		6	11		7
Socialization	22		12		8		8	
Production Systems	35		6		2	5		2
Work Skills	19		20		4	5		2
Training & Education	27		4		4	6		9
Marketing	14		22		8		6	
Labor	17						2	
Power & Energy	31		9		1	5		4
Inventions & Development	25		13		10		2	
Industrial Organization		30			17		3	
Planning & Control		24			7		19	
Tools	35		1		3	9		2
Processes	24		7		4		15	
Scientific Development		40			7		3	
Consumer Products		18			5		27	
Occupations		28			7		15	
Transportation	40		4		4	0		2
Services		33			14		3	
Environment	12		12		8	18		
Economic Structure	17		15		3	5		9

specific age of productive society that the respondents in the total group favored as being either most important or least important for all twenty-three characteristics. The frequency of respondents' choice for the most important age was concentrated in the power age, the atomic age and the cybernetics age while the frequency of respondents' choice for the least important age was concentrated in the modern craft age and the modern craft and machine ages combined.

Tables 6 and 7 reveal three specific response patterns for the total group. First, Table 6 shows that fifty per cent or more of the respondents in the total group selected either the cybernetics age alone or the atomic and cybernetics ages combined as being the most important time period for the following six characteristics of productive society: management and personnel, labor, inventions and development, industrial organization, scientific development, and services. Secondly, Table 7 indicates that fifty per cent or more of the respondents in the total group selected either the modern craft age alone or the modern craft and the machine ages combined as being the least important time period for: management and personnel, production systems, training and education, power and energy, inventions and development, industrial organization, tools, scientific development, occupations, transportation, and services. Finally, Table 6 and Table 7 show that fifty per cent or more of the respondents in the total group selected either the modern craft age alone or the modern craft and machine ages combined as being the least important time period for five characteristics of productive society. Moreover, the respondents

also chose either the cybernetics age alone or the atomic and cybernetics ages combined as being the most important time period for the same five characteristics of productive society. The characteristics were: management and personnel, inventions and development, industrial organization, scientific development, and services.

Tables 8, 9, 10, and 11 illustrate what the respondents in the male, female, industrial arts, and non-industrial arts groups selected to be the most important age of productive society. These tables indicate that, similar to the total group, the responses of the male, female, industrial arts, and non-industrial arts groups were varied; and, as in the case of the total group, the frequency of respondents' choice for the most important age of productive society was concentrated in the power age, the atomic age and the cybernetics age.

TABLE 8

FREQUENCY OF RESPONDENTS' CHOICE FOR THE MOST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(MALE) *

* n = 22	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	1		2		10		9	
Management & Personnel	3			4			15	
Communication Information	0		3		4	9		6
Materials	0		5		1	9		7
Socialization	1		3		5		13	
Production Systems	0		1		4	10		7
Work Skills	2		1		2	8		9
Training & Education	0		8		1	4		9
Marketing	4		1		9		8	
Labor	1			2			19	
Power & Energy	2		0		6	3		11
Inventions & Development	1		2		5		14	
Industrial Organization		1			2		19	
Planning & Control		3			13		6	
Tools	0		3		9	9		1
Processes	5		1		4		12	
Scientific Development		0			11		11	
Consumer Products		3			11		8	
Occupations		2			14		6	
Transportation	1		0		2	9		10
Services		1			2		19	
Environment	10		6		3	3		
Economic Structure	1		2		6	6		7

TABLE 9

FREQUENCY OF RESPONDENTS' CHOICE FOR THE MOST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(FEMALE)*

* n = 28	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	8		1		6		13	
Management & Personnel	3			8			17	
Communication Information	0		8		3	8		9
Materials	2		1		1	10		14
Socialization	5		3		10		10	
Production Systems	1		1		6	8		12
Work Skills	3		0		8	13		4
Training & Education	1		10		6	2		9
Marketing	2		2		10		14	
Labor	2			2			24	
Power & Energy	6		1		9	6		6
Inventions & Development	2		3		9		14	
Industrial Organization		5			6		17	
Planning & Control		6			16		6	
Tools	7		3		5	7		6
Processes	4		8		6		10	
Scientific Development		1			10		17	
Consumer Products		8			16		4	
Occupations		2			16		10	
Transportation	3		1		8	9		7
Services		2			4		22	
Environment	11		6		6	5		
Economic Structure	4		2		7	8		7

TABLE 10
 FREQUENCY OF RESPONDENTS' CHOICE FOR THE MOST
 IMPORTANT AGE OF PRODUCTIVE SOCIETY
 (INDUSTRIAL ARTS)*

* n = 22	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	0		2		10		10	
Management & Personnel	1			5			16	
Communication Information	0		3		3	9		7
Materials	0		4		1	8		9
Socialization	3		2		6		11	
Production Systems	0		0		5	10		7
Work Skills	1		1		3	9		8
Training & Education	0		7		2	2		11
Marketing	3		1		8		10	
Labor	1			1			20	
Power & Energy	1		1		6	5		9
Inventions & Development	0		2		7		13	
Industrial Organization		1			1		20	
Planning & Control		2			12		8	
Tools	1		3		7	9		2
Processes	4		2		5		11	
Scientific Development		0			9		13	
Consumer Products		5			8		9	
Occupations		1			15		6	
Transportation	1		0		4	10		7
Services		1			2		19	
Environment	12		5		3	2		
Economic Structure	0		3		8	6		5

TABLE 11

FREQUENCY OF RESPONDENTS' CHOICE FOR THE MOST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(NON-INDUSTRIAL ARTS)*

* n = 28	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	9		1		6		12	
Management & Personnel	5			7			16	
Communication Information	0		8		4	8		8
Materials	2		2		1	11		12
Socialization	3		4		9		12	
Production Systems	1		2		5	8		12
Work Skills	4		0		7	12		5
Training & Education	1		11		5	4		7
Marketing	3		2		11		12	
Labor	2			3			23	
Power & Energy	7		0		9	4		8
Inventions & Development	3		3		7		15	
Industrial Organization		5			7		16	
Planning & Control		7			17		4	
Tools	6		3		7	7		5
Processes	5		7		5		11	
Scientific Development		1			12		15	
Consumer Products		6			19		3	
Occupations		3			15		10	
Transportation	3		1		6	8		10
Services		2			4		22	
Environment	9		7		6	6		
Economic Structure	5		1		5	8		9

Tables 12, 13, 14, and 15 illustrate what the respondents in the male, female, industrial arts, and non-industrial arts groups selected to be the least important age of productive society. As in the case of the total group, there was no evident trend in Table 12, 13, 14 or 15 which would have indicated one specific age of productive society that the respondents in any particular group favored as being the least important for all twenty-three characteristics of productive society. The frequency of respondents' choice for the least important age was concentrated in the modern craft and machine ages.

The male, female, industrial arts and non-industrial arts groups displayed response patterns which were similar to the total group's responses. A more complete picture of the responses of each group is illustrated in Figure 2. Figure 2 presents a comparison of the five groups' responses in terms of the following response patterns:

1. The first row presents the characteristics for which fifty per cent or more of the respondents in a particular group were in agreement that either the cybernetics age alone or the atomic and cybernetics ages combined was the most important but, for which the respondents were not necessarily in agreement regarding the least important age.
2. The second row presents the characteristics for which fifty per cent or more of the respondents in a particular group were in agreement that either the modern craft age alone or the modern craft and machine ages combined was the least important but, for which the respondents were not necessarily in agreement regarding the most important age.

TABLE 12

FREQUENCY OF RESPONDENTS' CHOICE FOR THE LEAST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(MALE)*

*n = 22	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	3		15		3		1	
Management & Personnel	14			5			3	
Communication Information	4		1		8	1		8
Materials	8		5		3	4		2
Socialization	11		5		5		1	
Production Systems	15		2		2	2		1
Work Skills	8		8		1	3		2
Training & Education	14		0		2	3		3
Marketing	10		8		2		2	
Labor	6			16			0	
Power & Energy	14		6		0	0		2
Inventions & Development	11		6		5		0	
Industrial Organization		12			10		0	
Planning & Control		13			1		8	
Tools	16		1		1	3		1
Processes	12		2		2		6	
Scientific Development		18			2		2	
Consumer Products		12			2		8	
Occupations		14			2		6	
Transportation	18		3		1	0		0
Service		17			5		0	
Environment	7		4		3	8		
Economic Structure	7		8		2	2		3

TABLE 13

FREQUENCY OF RESPONDENTS' CHOICE FOR THE LEAST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(FEMALE)*

* n = 28	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	7		14		6		1	
Management & Personnel	12			11			5	
Communication Information	1		1		11	3		12
Materials	8		5		3	7		5
Socialization	11		7		3		7	
Production Systems	20		4		0	3		1
Work Skills	11		12		3	2		0
Training & Education	13		4		2	3		6
Marketing	4		14		6		4	
Labor	11			15			2	
Power & Energy	17		3		1	5		2
Inventions & Development	14		7		5		2	
Industrial Organization		18			7		3	
Planning & Control		11			6		11	
Tools	19		0		2	6		1
Processes	12		5		2		9	
Scientific Development		22			5		1	
Consumer Products		6			3		19	
Occupations		14			5		9	
Transportation	22		1		3	0		2
Services		16			9		3	
Environment	5		8		5	10		
Economic Structure	11		7		1	3		6

TABLE 14

FREQUENCY OF RESPONDENTS' CHOICE FOR THE LEAST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(INDUSTRIAL ARTS)*

*n = 22	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	2		15		4		1	
Management & Personnel	15			5			2	
Communication Information	3		2		7	0		10
Materials	10		3		3	4		2
Socialization	10		6		4		2	
Production Systems	16		3		1	1		1
Work Skills	11		7		1	1		2
Training & Education	14		1		2	2		3
Marketing	9		9		3		1	
Labor	6			16			0	
Power & Energy	16		6		0	0		0
Inventions & Development	11		5		6		0	
Industrial Organization		12			10		0	
Planning & Control		14			1		7	
Tools	18		0		0	3		1
Processes	11		3		2		6	
Scientific Development		19			2		1	
Consumer Products		10			3		9	
Occupations		13			2		7	
Transportation	19		2		1	0		0
Services		16			6		0	
Environment	7		4		3	8		
Economic Structure	10		5		2	1		4

TABLE 15

FREQUENCY OF RESPONDENTS' CHOICE FOR THE LEAST
IMPORTANT AGE OF PRODUCTIVE SOCIETY
(NON-INDUSTRIAL ARTS) *

* n = 28	Modern Craft Age	Modern Craft and Machine Ages	Machine Age	Machine and Power Ages	Power Age	Atomic Age	Atomic and Cybernetics Ages	Cybernetics Age
Natural Resources	7		13		6		2	
Management & Personnel	10			10			8	
Communication Information	2		0		11	7		8
Materials	5		6		2	8		7
Socialization	9		7		2		10	
Production Systems	16		4		1	5		2
Work Skills	10		10		3	4		1
Training & Education	10		5		2	5		6
Marketing	4		12		7		5	
Labor	10			12			6	
Power & Energy	14		2		2	5		5
Inventions & Development	14		8		3		3	
Industrial Organization		14			8		6	
Planning & Control		8			9		11	
Tools	15		1		5	6		1
Processes	12		4		2		10	
Scientific Development		17			9		2	
Consumer Products		5			6		17	
Occupations		13			8		7	
Transportation	17		1		3	1		6
Services		12			8		8	
Environment	5		7		6	10		
Economic Structure	9		7		2	3		7

3. The last row presents the characteristics for which fifty per cent or more of the respondents in a particular group selected either the cybernetics age alone or the atomic and cybernetics ages combined as being the most important and, either the modern craft age alone or the modern craft and machine ages combined as the least important.

The first row of Figure 2 shows that all groups selected either the cybernetics age or the atomic and cybernetics ages combined as being the most important time period for the following characteristics of productive society: management and personnel, labor, inventions and development, industrial organization, scientific development, and services. Note, from the first row of Figure 2, that the number of characteristics for which either the cybernetics age or the atomic and cybernetics ages combined were considered to be the most important time period was low. No group selected either the cybernetics age or the atomic and cybernetics ages combined as being the most important time periods for more than nine characteristics.

The second row of Figure 2 shows that all groups selected either the modern craft age alone or the modern craft and machine ages combined as being the least important time period for the following seven characteristics: production systems, power and energy, inventions and development, industrial organization, tools, scientific development, and transportation. The number of characteristics for which either the modern craft age or the modern craft and machine ages combined were considered to be the least important time period was

	Male (11 or more respondents)	Female (14 or more respondents)	Industrial Arts (11 or more respondents)	Non-Industrial Arts (14 or more respondents)	Total Group (25 or more respondents)
Most Important Age Cybernetics Age or Atomic and Cybernetics Ages combined	Management and Personnel Socialization Labor Power and Energy Inventions and Development Industrial Organization Processes Scientific Development Services	Management and Personnel Materials Marketing Labor Inventions and Development Industrial Organization Scientific Development Services	Management and Personnel Socialization Training and Education Labor Inventions and Development Industrial Organization Processes Scientific Development Services	Management and Personnel Labor Inventions and Development Industrial Organization Scientific Development Services	Management and Personnel Labor Inventions and Development Industrial Organization Scientific Development Services
Least Important Age Modern Craft Age or Modern Craft and Machine Ages combined	Management and Personnel Socialization Production Systems Training and Education Power and Energy Inventions and Development Industrial Organization Planning and Control Tools Processes Scientific Development Consumer Products Occupations Transportation Services	Production Systems Power and Energy Inventions and Development Industrial Organization Tools Scientific Development Occupations Transportation Services	Management and Personnel Production Systems Work Skills Training and Education Power and Energy Inventions and Development Industrial Organization Planning and Control Tools Processes Scientific Development Occupations Transportation Services	Production Systems Power and Energy Inventions and Development Industrial Organization Tools Scientific Development Transportation Services	Management and Personnel Production Systems Training and Education Power and Energy Inventions and Development Industrial Organization Tools Scientific Development Occupations Transportation Services
Least Important Age Modern Craft Age or Modern Craft and Machine Ages combined Also Most Important Age Cybernetics Age or Atomic and Cybernetics Ages combined	Management and Personnel Socialization Power and Energy Inventions and Development Industrial Organization Processes Scientific Development Services	Inventions and Development Industrial Organization Scientific Development Services	Management and Personnel Training and Education Inventions and Development Industrial Organization Processes Scientific Development Services	Inventions and Development Industrial Organization Scientific Development Services	Management and Personnel Inventions and Development Industrial Organization Scientific Development Services

Figure 2

Characteristics for Which 50% or More of the Respondents in Each Group Selected Present Day Productive Society as Being Most Important and the Earliest Forms of Productive Society as Least Important

also low. However, a comparison of the number of characteristics in the first row of Figure 2 with the number of characteristics in the second row indicates that, in all groups, the respondents selected either the modern craft age or the modern craft and machine ages combined as being the least important time period in more instances than they selected either the cybernetics age or the atomic and cybernetics ages combined as being the most important time period.

Finally, the third row of Figure 2 indicates that the respondents in all of the groups were in agreement that either the modern craft age or the modern craft and machine ages combined were the least important time periods and that either the cybernetics age or the atomic and cybernetics ages combined were the most important time periods for three characteristics. The characteristics were: inventions and development, industrial organization, and scientific development.

The findings for three specific characteristics in this section of Chapter 4 were of particular interest. Tables 6 to 15 inclusive showed that, although communication information, consumer products, and environment, did not all receive fifty per cent or more of the respondents' choice for any particular age or time period of productive society, they all appeared to have a similar response pattern. The response pattern for these characteristics indicated that either the modern craft age or the modern craft and machine ages combined were the most important time periods.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to determine how junior high school students in Calgary Separate Schools interpreted the concept of productive society. The purpose was divided into the following tasks:

1. To determine how specific groups of junior high school students ranked, in order of importance, the twenty-three characteristics of productive society.
2. To determine which of five ages of productive society was considered, by specific groups of junior high school students, to be the most important for the twenty-three characteristics of productive society.
3. To determine which of five ages of productive society was considered, by specific groups of junior high school students, to be the least important for the twenty-three characteristics of productive society.

The population for the study consisted of all the junior high school students in the Calgary Separate School System. From this population a stratified random sample of fifty students was selected.

Data for the study were collected by administering a revised form of Lewchuk's Opinionnaire on Productive Society. The revised instrument, called "The Student's Opinionnaire of Productive Society" consisted of: a booklet containing definitions for each of the twenty-three characteristics of productive society, a corrected version of Lewchuk's part 1, and a reworded version of Lewchuk's part 2. The instrument was administered to the sample group who

were required to complete part 1 and part 2.

The completed instruments were analyzed in the same manner used by Lewchuk. The booklet containing the matched pairs was analyzed by Thurstone's Law of Paired Comparisons and the other booklet was analyzed in the same manner used by Lewchuk for analyzing part 2 of his instrument.

Summary of Findings

The findings of the study can be summarized as follows:

1. The various groups of junior high school students were not in agreement with regard to a specific order in ranking the twenty-three characteristics of productive society. However, the findings indicated a similarity in the way the respondents in all groups ranked the characteristics. High scale values were assigned to industrial organization, power and energy, work skills and scientific development. Low scale values were assigned to transportation, consumer products, and processes.
2. Correlation values for the groups also indicated that the way in which the groups ranked twenty-three characteristics of productive society were similar. However, the correlation values between the male and female groups, and between the industrial arts and non-industrial arts groups were not significant at the .01 level.
3. The industrial arts group ranked work skills and industrial organization as the two most important characteristics of

productive society. The group also ranked occupations as eighteenth in order of importance, and materials, production systems, and consumer products as three of the least important characteristics of productive society.

4. There was no evident trend that the respondents in any particular group favored one particular time period of productive society as being most important or least important for all twenty-three characteristics of productive society. The frequency of respondents' choice for the most important age was concentrated in the power age, the atomic age, and the cybernetics age. The frequency of respondents' choice for the least important age was concentrated in the modern craft age and the machine age.
5. Fifty per cent or more of the respondents in each group selected either the modern craft age or the modern craft and machine ages combined as being the least important time periods in more instances than they selected either the cybernetics age or the atomic and cybernetics ages combined as being the most important time period.
6. Fifty per cent or more of the respondents in all groups were in agreement that either the modern craft age or the modern craft and machine ages combined were the least important time periods and that either the cybernetics age or the atomic and cybernetics ages combined were the most important time periods for the following three characteristics: inventions and development, industrial organization, and scientific development.

7. For environment all groups selected either the modern craft age or the modern craft and machine ages combined as being the most important time periods and either the cybernetics age or the atomic and cybernetics ages combined as being the least important time periods.
8. Either the modern craft age or the modern craft and machine ages combined were considered as being the most important time periods for consumer products and for communication information.

Conclusions

1. Although variations in the rank ordering of the twenty-three characteristics of productive society existed between the various groups of junior high school students, the correlation values between the total group and each of the other groups indicated that junior high school students in Calgary Separate Schools in general held similar opinions with regard to the relative importance of twenty-three characteristics of productive society. Furthermore, the scale values assigned to the characteristics by each group indicate that junior high school students in Calgary Separate Schools were of the opinion that industrial organization, power and energy, work skills and scientific development were very important factors in their type of productive society, while consumer products, transportation, and processes were the least important factors in their type of productive society.

2. The low correlation value between the male group and the female group suggests that male and female junior high school students

in Calgary Separate Schools held a different opinion regarding the relative importance of the twenty-three characteristics in their type of productive society. Further study is required in this area to determine the extent of this difference of opinion.

3. The rank ordering of the twenty-three characteristics by the industrial arts group was of interest. Occupations was ranked eighteenth in order of importance (scale value -0.751), indicating that low emphasis was placed on occupations as being important. This appeared to be somewhat inconsistent with a statement in the Junior High School Curriculum Guide for Industrial Arts which maintained that an objective of industrial arts is: "To provide a supplementary guidance function by introducing the students to the multiplicity and interrelationship of educational and occupational opportunities [p. 3]". In addition, one of the fields of study in the junior high school industrial arts program is materials. The Junior High School Curriculum Guide for Industrial Arts (1969) stated

Wood, metals, plastics and earths are all extremely important materials.

. . .

This field should bring the student into contact with the more common materials, tools, equipment and processes as used by industry.

. . .

Emphasis should be placed on testing and evaluating materials for the purposes to which they can be adapted [p. 27].

The above quote suggests that not only materials but also processes, production systems, and consumer products are important factors of a productive society and should be impressed upon the junior high school industrial arts student. However, the findings showed that the

industrial arts group ranked materials, production systems, and consumer products as three of the least important characteristics of productive society. Therefore, it was concluded that some of the objectives of the junior high school industrial arts curriculum were not being achieved in the Calgary Separate School System.

4. Part two of the opinionnaire was designed to determine which of five ages of productive society was considered, by the respondents in each group, to be the most important for all twenty-three characteristics. Because the responses by each group were varied and unpredictable, it was concluded that junior high school students in Calgary Separate Schools did not agree that there was a specific age of productive society which was most important or least important for all twenty-three characteristics of productive society. This conclusion is supported by the fact that the frequency of respondents' choice (in each group) for the most important age was concentrated in three ages (the power age, the atomic age, and the cybernetics age), while the frequency of respondents' choice for the least important age was concentrated in two ages (the modern craft age and the machine age).

5. If it can be assumed that a knowledge of present day productive society is most important and that a historical knowledge of the earliest forms of productive society is least important, then the respondents in each of the groups should have chosen either the cybernetics age alone or the atomic and cybernetics ages combined as their most important choice for all twenty-three characteristics

of productive society; and conversely, the respondents' least important choice for all twenty-three characteristics should have been either the modern craft age alone or the modern craft and machine ages combined. However, the third row in Figure 4 (Chapter 4) showed that in each group, the number of characteristics for which either the cybernetics age alone or the atomic and cybernetics ages combined were selected as being the most important and, either the modern craft age alone or the modern craft and machine ages combined as being the least important, was low. This indicated that the ability of the respondents to discriminate between the most important age and the least important age for each characteristic was low. Furthermore, the number of characteristics for which either the cybernetics age alone or the atomic and cybernetics ages combined were selected as being the most important was also low. Therefore, it was concluded that a general understanding of productive society by junior high school students in Calgary Separate Schools was low; and in addition, the understanding of present day productive society by junior high school students in the Calgary Separate Schools was also low. Finally, because the students in all groups were able to select the least important time period of productive society (modern craft age or modern craft and machine ages combined) for more characteristics of productive society than they were able to select for the most important time period (cybernetics age or atomic and cybernetics ages combined), it was concluded that junior high school students in Calgary Separate Schools possessed a greater understanding of early forms of productive society than present day productive society.

6. Further study is required into communication information, consumer products, and environment. These characteristics showed a response trend which was opposite to what could have been expected if it was assumed that a knowledge of present day productive society is most important and a knowledge of the earliest forms of productive society is least important. Further study is required to determine why students selected the modern craft and machine ages as being the most important and the atomic and cybernetics ages as being the least important for these ages.

Comparison of the Findings With Lewchuk's Findings

Because the study reported here relied heavily upon the study done by Lewchuk, it is appropriate at this time to note that there did not appear to be any similarities between the findings of this study and Lewchuk's findings. The respondents in Lewchuk's study and the respondents in this study ranked the twenty-three characteristics differently. The two groups of respondents also held different opinions regarding the ages of productive society which they considered to be the most important and least important for the twenty-three characteristics of productive society. No specific conclusions were drawn from the dissimilarities between the findings of the two studies because Lewchuk's study involved the industrial arts teachers in the province of Alberta while the present study only involved the junior high school students in one school system in the province of Alberta.

Recommendations

If it can be agreed that an understanding of productive society is an important segment of a junior high school student's education, and if Lewchuk's description of productive society is accepted as a valid criterion of evaluation from which teachers could begin teaching for a better understanding of productive society, then the following recommendations are presented:

1. Junior high school teachers in Calgary Separate Schools should place more emphasis on teaching the importance of transportation, consumer products, and processes in contemporary productive society. These characteristics were considered by the students to be the least important even though these students are living in an age where man has travelled to the moon and where there is an ever increasing demand for new and more economical products.

2. Junior high school industrial arts teachers in Calgary Separate Schools should critically examine their individual industrial arts programs and endeavor to achieve all of the junior high school industrial arts objectives as set down by the department of education. Furthermore, junior high school industrial arts teachers should strive to impress upon their students that all characteristics of productive society, including materials, processes, transportation, and consumer products, are important in present day productive society.

3. In the Calgary Separate School System, industrial arts personnel in general should assume the responsibility of upgrading junior high school industrial arts programs in an attempt to raise

the level of understanding of productive society. Specifically, they should initiate programs which would de-emphasize early forms of productive society and strive for a better understanding of present day productive society.

4. Further research should be conducted on junior high school students to determine why, in their opinion, the modern craft and machine ages are the most important ages of productive society for consumer products, communication information, and environment.

5. It would be of interest to determine whether junior high school students in the Calgary Separate School System are unique in their responses to The Student's Opinionaire of Productive Society; therefore, the instrument should be administered to other junior high school students not in the system and a comparison of the responses should be made.

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APPENDICES

APPENDIX A

Outline of Lewchuk's Development of the
Twenty-Three Characteristics of Productive Society

Outline of Lewchuk's Development of the Twenty-Three Characteristics of Productive Society

Power and Energy

A. Modern Craft Age

1. The muscles of humans and animals were the most common sources of power.
2. The labor force was primarily unskilled.
3. The windmill was the chief power source for pumping water.
4. The water turbine was invented toward the end of this age.

B. Machine Age

1. The machine age was a result of the industrial revolution.
2. The steam engine was the main source of power and the most important development of this age.
3. Line-shaft transmission was important to utilize the power produced by the steam engine.
4. Coal was discovered and increased the fuel supply for steam engines.
5. Human muscle power was still used.

C. Power Age

1. There was a wide spread use of electricity in the power age.
2. The internal combustion engine provided a means of portable power.
3. Coal gas was developed for lighting and heating for industrial use.
4. The diesel engine and the turbine were extensively used.

D. Atomic Age

1. The use of atomic energy was man's greatest invention and discovery.

2. The development of atomic energy resulted in a reduction of fuel consumption.
3. Hydraulic power was developed.
4. Petroleum and uranium became prime sources of power.
5. Atomic power was primarily used for the production of electrical power for industrial and domestic use.
6. Atomic energy was used for the detection and treatment of cancer.

E. Cybernetics Age

1. Because there is a danger of energy depletion, energy conservation has become important.
2. Natural gas became a source of power and energy.
3. Research began into new sources of energy and power such as: use of fuel cells, use of solar energy, use of tidal power for electrical power generation, and the use of nuclear energy was expanded.

Natural Resources

A. Modern Craft Age

1. The basic natural resources such as water, metals, minerals, forests, petroleum, and fertile soil existed but were not well developed.
2. Land, as a basic resource, was used extensively for agriculture.
3. Wood was used for structural purposes and for fuel, but there were no established lumbering techniques.
4. There was little or no advantage taken of using mineral resources.

B. Machine Age

1. Coal and iron were the most important natural resources being used.
2. Coal and iron revolutionized the manufacturing industry.

3. Agricultural methods were improved and resulted in an agricultural revolution.
4. The processes of making steel and alloying were discovered.

C. Power Age

1. Forests, land, minerals and water were the main natural resources developed in this age.
2. There was a wider and more intensive use of natural resources because processing techniques and methods were being developed.
3. The conservation of natural resources started.

D. Atomic and Cybernetics Ages

These ages were combined because no differentiation exists between them.

1. The conservation of natural resources was the main theme.
2. The waste of natural resources became evident; therefore, extensive research was initiated to utilize resources better.
3. Conservation led to the development of shale oil, tar sands, poor ore deposits, and poor coal deposits.

Tools

A. Modern Craft Age

1. Hand tools which were crude and simple, but functional for the purpose which they were designed, existed.
2. Measuring instruments were very crude.
3. The tools were made from wood, crude forms of iron, and sometimes bronze.

B. Machine Age

1. The machine age was the most significant period in the history of machine and tool development.
2. The industrial revolution led to the development of simple machines and an increase in the variety of hand tools.

3. The development of simple machines such as the wheel and shaft, the metal lathe, and the planer resulted in increased productivity.

C. Power Age

1. Precision, automation, speed, quality control, and the use of complex machines were the important factors of the power age.
2. The growth of markets for machine tools and the improvement of technical skills and knowledge created an industry of product specialization.
3. Machine tools rather than hand tools played the dominant role in the power age.

D. Atomic Age

1. The automatic factory and precision were important.
2. Improved methods of toolmaking, a larger range of tools and better holding devices, improved production systems and increased production.
3. High precision measuring instruments such as gauge blocks and micrometers enabled a high interchangeability of parts.

E. Cybernetics Age

1. Total automation was made possible through computer technology.
2. The use of the computer and its application to machine tools and automatic transfer machines was the most significant development of this age.
3. Numerical control, automation and computers were the key words of modern industrial society.
4. Emphasis was placed on technological developments in the forms of storage, transportation, and data processing.

Materials

A. Modern Craft Age

1. Simple natural resources such as wood, iron and bronze were used to manufacture materials for the production of goods.
2. There were few products and materials and these were simple.
3. The most common materials of this age included: cotton, silk, wool, cloth and thread, some glass, cast iron, leather, paper, ink and lumber.

B. Machine Age.

1. The making of steel was an important factor of the machine age.
2. Processed copper was also an important material used in the machine age.
3. Toward the end of this age malleable iron, charcoal, coke, natural cement, and machine-made paper and cloth were common materials.

C. Power Age

1. Metal alloys were the most noted development in the power age.
2. It became possible to product light-weight and yet strong alloys because aluminum and hydroelectric power became abundant.
3. There was an increased use of steel, chemicals, celluloid, glass, silver, silicon, selenium, tungsten, manganese and chemicals for corrosion resistance.
4. Synthetic compounds began to replace some common materials such as wood,paper and glass.

D. Atomic Age

1. The atomic age utilized a new range of synthetic materials which included plastics, and super alloys with extremely desirable strength and heat resistance.
2. Elements such as titanium, zirconium, chromium, molybdeum were important in the manufacture of tools and equipment.
3. The characteristics of strength, heat resistance, insulation, resistivity to electricity and corrosion were noted developments in materials during the atomic age.

E. Cybernetics Age

1. Emphasis was placed on handling techniques of materials to eliminate waste and reduce damage due to transportation procedures.
2. Research and development were important to improve manufacturing processes and to develop new materials.
3. New materials such as powdered metal and new metal alloys were developed.

Work Skills

A. Modern Craft Age

1. Skilled craftsmen performed all of the necessary operations in the production of goods.
2. There was an abundance of unskilled manual labor to do the lifting, hauling, and moving of the goods from one place to another.
3. This age was also characterized by much unskilled farm labor.

B. Machine Age

1. The skilled craftsman became a semi-skilled machine operator who specialized in doing only certain operations.
2. The handicraft worker no longer competed with other craftsmen but rather, he competed with industry and machine.
3. Machines were doing much of the work done by hand and finally the factory system brought an end to the craft skills.

C. Power Age

1. This age demanded work skills such as alertness, responsiveness, and an intelligent grasp of mechanization.
2. The worker had to be an all-round mechanic rather than a specialized hand or skilled craftsman.
3. The need for unskilled manual labor was reduced by use of machines and new occupations such as skilled machinists, technicians, and inspectors.

D. Atomic Age

1. An increased emphasis on intelligence and the ability to respond quickly and efficiently was the prime requirement of workers.
2. The demand for semi-skilled and unskilled workers such as farm laborers and industrial workers became very low; instead, there was a demand for designers, engineers and skilled technicians.
3. Every person who was to enter any type of job had to possess certain intellectual skills so that he could be trained quickly and efficiently on the job.

E. Cybernetics Age

1. Highly skilled technicians were required for computer maintenance, operation and programming.
2. The skill of manipulation of buttons and controls became the main type of activity.
3. Some skills that were required were: management qualities, decision making ability, and being able to exercise responsibility.

Inventions and Developments

A. Modern Craft Age

Some inventions and developments in this age were:

1. Paper
2. Smelting of iron
3. Water wheels
4. Use of coke
5. Discovery of gases.

B. Machine Age

Some important inventions and developments of the Machine Age were:

1. Iron casting

2. The steam engine
3. Factory and manufacturing
4. The telegraph
5. Rubber products.

C. Power Age

1. This age was noted for its gains in power conversion and mass production of textiles, iron, and steel machinery.
2. The railway era began.
3. The power age was responsible for the foundation of modern sociology and biology.

D. Atomic and Cybernetics Ages

1. There was a development of scientific and technical research laboratories.
2. Automation and feedback control were developed.
3. The professional scientist, engineer and researcher worked together to create new and improved products, machines and tools.
4. There was an acceleration of change which greatly affected society.

Scientific Development

A. Modern Craft and Machine Ages

1. There was little or no scientific development in these ages and there was no clear definition of science and scientific principles.
2. Only simple scientific principles were applied to industrialism.
3. There was some knowledge of science and mathematics which resulted in some noteworthy inventions.

B. Power Age

1. A clearer relationship between science and technology was established.

2. Scientists became interested in technological developments and the application of their discoveries.
3. Some scientific developments were: inorganic and organic chemistry, conservation of energy, electron theory, radio activity, atomic structure, electromagnetism, and isotopes.

C. Atomic and Cybernetics Ages

1. These ages saw the most significant application of science and technology to modern industrialism.
2. The methods of scientific development were more accurate and rational than before.
3. There was a development of synthetics, hormones, silicones, wave and quantum mechanics, uranium fission, and modern electronics.

Production Systems

A. Modern Craft Age

1. One craftsman was the head of a family owned system.
2. Simple hand tools were used and production output was limited.
3. There were no real formal or structured systems of production.

B. Machine Age

1. The factory system and continuous production originated in the machine age.
2. Manually controlled machines and cutting tools were used.
3. All assembly took place under one roof.
4. There was no evidence of quality control.

C. Power Age

1. Mass production began.
2. The manual handling of materials was replaced by machine handling.
3. Assembly line production became important.

D. Atomic Age

1. Automation and standardization were key factors of this age and resulted in a high degree of sophisticated mass production.
2. Automation enabled the development of control over the manufacturing process.
3. Automation resulted in lower labor costs and increased productivity.

E. Cybernetics Age

1. There was a high degree of quality control.
2. The computer controlled production lines.
3. Refined transfer machines moved material from one phase of production to another.

Processes

A. Modern Craft Age

Some processes were:

1. Simple iron casting
2. Wood turning
3. Forging.

B. Machine Age

Some processes were:

1. Iron puddling
2. Carburization for case hardening of steel.
3. Using coal gas for heating and lighting.
4. Use of coal tar dyes for industrial use.

C. Power Age

Some processes were:

1. Machining
2. Hydraulic pressing
3. Bessemer and open hearth steel making.

D. Atomic and Cybernetics Ages

1. There was a whole new world of chemical synthetics which produced new synthetic materials.
2. The development of catalysts opened up new ideas of processing.
3. The alloying, annealing, heat treating, plating and anodizing processes were made more reliable.
4. Plastics, resins, and coal tar distillates were developed.

Transportation

A. Modern Craft Age

1. Land travel was done by walking and animals were used to draw small wagons.
2. Inland travel was usually short range and did not convey great amounts of goods or people at one time.
3. Travel was done on earth roads and inland waterways.

B. Machine Age

1. The steam locomotive and railways using steel rails were introduced.
2. The steam boat was used for ocean travel and for inland water ways.
3. There was continental travel.

C. Power Age

1. This age is known as the railway era; it resulted in faster transportation, longer distances covered, and more goods and people transported.
2. The automobile industry began and improved roads allowed for improved travel in rural and suburban areas.

3. Iron ships were common and could carry greater amounts of materials than before.

D. Atomic Age

1. There were tremendous developments and improvements in automobile and air travel.
2. The jet driven aircraft was developed.
3. There were atomic ships and trains.
4. There was an extensive development of roads and bridges.

E. Cybernetics Age

1. Rocket travel was introduced.
2. There were large freight carrying aircraft and supersonic transports.
3. Pipelines and conveyor belts were extensively used.

Communication Information

A. Modern Craft Age

1. This age had the simplest and least developed methods of communication.
2. Word of mouth and messenger were the most common means of communication.
3. There was some drawing and writing but these were not well developed.

B. Machine Age

1. There were small newspapers carried in a mail system from community to community.
2. The writing of letters was common and mail was transported by rail and water.
3. The telephone and telegraph existed.

C. Power Age

1. This was the most noteworthy age with regard to communication.
2. The power age saw the beginnings of mass communication through the use of radio, television, motion pictures, microfilm and magnetic tape.
3. Postal service was widespread.

D. Atomic Age

1. The world seemed to be shrinking in size because of improved communication which made it easy to contact people on the other side of the world.
2. Visual communication, apart from newspapers, became the most notable development.
3. Two-way radio communications, radar, and electronic computers revolutionized the communications industry.

E. Cybernetics Age

1. Transistors resulted in miniaturization of electronic equipment.
2. Long distance and interplanetary communication became possible.
3. A new concept in communication became important, that of conveying accurate information, in the form of commands and orders, in large organizations and corporations. The larger the organization became, the slower and less accurate the communication information because it had to go through numerous channels. This is known as red tape.

Labor

A. Modern Craft Age

1. There was much cheap, unskilled labor.
2. Productivity was low.
3. There was simple apprenticeship which was long and tedious.
4. The guilds were the only forms of organized labor.

B. Machine and Power Ages

1. There were very few labor organizations as we know them today, however, unions were starting.
2. Working conditions in the factories were bad and use of child labor was extensive.
3. Because of the factory system the employee-employer relationship developed.

C. Atomic and Cybernetics Ages

During these ages labor was organized to a high degree, resulting in the following:

1. Educational requirements increased and on-the-job training was the most common means of placing a person in a work situation.
2. Labor unions achieved security of wages, fringe benefits, controlled working hours and conditions, laws to protect workers from unjust treatment by management.
3. Collective bargaining between labor organizations and management became an effective method of settling disputes and where settlements could not be reached, procedures such as strikes, picketing and work-to-rule were used against management.

Management and Personnel

A. Modern Craft Age

1. There were no management-personnel organizations as we know them today.
2. One craftsman controlled the entire operation.
3. The craftsman was usually the sole owner and operator of his business.

B. Machine and Power Ages

1. The factory system led to the development of positions for managers, foremen, and inspectors.
2. There was some scientific management and control apparent.
3. Some hierarchical structure was apparent and the authority structure increased.

C. Atomic and Cybernetics Ages

1. These ages witnessed the rise of management and management operations.
2. There was an extensive hierarchical structure and consequently increased bureaucratic control.
3. Management was in control of complete production systems.

Economic Structure

A. Modern Craft Age

1. The economic structure was simple and of use only to a few who controlled the land and who collected money for performing certain services.
2. There were few profits for the working class but large profits for a select few.
3. There was little or no investment to add to the economy.

B. Machine Age

1. Because industry was beginning to produce many goods, the economy passed from a factor of basic need to one of material acquisition.
2. The use of money based on credit led to banking.
3. Most of the businesses were privately owned and private investment kept these organizations alive.

C. Power Age

1. Population increases resulted in increases in business and consequently increased investment in machines, factories, production systems, and human resources.
2. The amount of investment determined the size of a producing unit.
3. Small scale privately owned businesses were being dissolved --large organized businesses were developed.

D. Atomic and Cybernetics Ages

1. In America the economy was an industrial economy rather than agricultural and a major portion of the labor force was engaged in manufacturing and services.
2. The economic activity was being organized into large industrial units such as the corporation which became the most important economic factor in America.
3. There were large capital investments into automation facilities and into research and development to increase productivity and overcome competition.

Industrial Organization

A. Modern Craft and Machine Ages

1. Manual labor was the form of industrial activity and productivity was low.
2. Ownership was simple; the landlord was sole owner and operator of a block of land.
3. The individual craftsman owned and operated a small business.

B. Power Age

1. Small companies were well established.
2. Private ownership and partnerships were becoming impractical and impossible.
3. The beginnings of large enterprise was evident.

C. Atomic and Cybernetics Ages

1. Large corporations were formed through mergers.
2. There was public ownership instead of private and there were government controls.
3. These ages saw the growth of such concepts as stocks, bonds, stockholders, and reinvestment.

Marketing

A. Modern Craft Age

1. Goods were manufactured to the quantities of orders placed.
2. The demand for goods usually exceeded the supply.
3. A few craftsmen produced on a large scale.

B. Machine Age

1. Trade began with other parts of the country and foreign markets developed.
2. The factory system produced more goods and increased trade.
3. Craftsmen and private owners handled their own trade.

C. Power Age

1. The power age witnessed increased foreign markets.
2. Improved transportation enabled a better distribution of goods making them within reach of almost every individual.
3. Trading of goods with other nations became common.

D. Atomic and Cybernetics Ages

1. Competition with foreign countries became common.
2. Wholesale and retail firms such as chain stores, mail order houses, department stores, shopping centers, individual credit stores and supermarkets were established.
3. Government controls such as fixed prices were introduced to protect the customers.
4. Marketing strategies improved through advertising and consumer education.

Planning and Control

A. Modern Craft and Machine Ages

1. The planning was done by one or more craftsmen.

2. Planning consisted of simple organizing of machines, tools and materials for manufacturing.
3. There was some blueprinting and specifying but there was little or no quality control.

B. Power Age

The power age saw the use of:

1. Blueprinting
2. Specifying
3. Standardization
4. Feedback
5. Data Processing.

C. Atomic and Cybernetics Ages

1. During these ages data processing and computers were used for design.
2. Efficiency studies on men and machines were common.
3. Controls such as quality control, numerical control and standardization were fully developed.

Training and Education

A. Modern Craft Age

1. The Modern Craft Age did not involve any complex training.
2. There was only elementary education where the elements of religion, writing, reading and arithmetic were taught.
3. After a certain age, individuals were placed in the care of a master craftsman and trained for a particular job or craft.

B. Machine Age

1. During this age governments supported technical training and education.

2. The apprenticeship system increased.
3. The first engineering schools appeared.

C. Power Age

1. Industrial training began in the power age.
2. Scientific knowledge was more widely diffused and technological implementation of knowledge was possible on a larger scale.
3. The emphasis was on mass general education.

D. Atomic Age

1. During this age, education was considered as a preparation of individuals for white-collar business and professional occupations and not for manual labor.
2. Technical administrative, and human relations skills were important in this age.
3. Industrial training was of prime importance and many businesses provided on-the-job training or financed education in well qualified schools and universities.

E. Cybernetics Age

1. The capacity to adapt to a new environment has become the single most important goal of modern education.
2. Cybernation has resulted in increased leisure time and society relies on education to determine how to use this time rewardingly.
3. The unskilled individual faces a lifelong process of education in order that he may continue to work.
4. There will have to be constant retraining for the skilled and the professional and, there will also have to be longer periods of formal education for the youth that will be entering the labor market.

Occupations

A. Modern Craft and Machine Ages

1. Occupational structure and mobility, as known today, did not exist in these ages.
2. Simple occupations existed within the craft guilds and agriculture.
3. There was a division of labor.

B. Power Age

1. This age saw the beginnings of the first occupational scale in which occupations were classified in some form of order.
2. The most significant factor of this age was that specialization and differentiation of tasks were occurring and people were conscious of it.

C. Atomic and Cybernetics Ages

1. Occupational position was an important factor in the determination of individual prestige and the allocation of certain types of social privileges.
2. Occupations were becoming more diversified as specialization increased.
3. There was a set hierarchy of occupations and every type of job was classified.

Services

A. Modern Craft and Machine and Power Ages

1. There were no service industries as known today.
2. There was some service in the form of machine maintenance and in other forms of work which did not involve the production of goods.

B. Atomic and Cybernetics Ages

1. Services have become an important factor in business and services must be constantly performed if a business is to succeed.

2. Services and the manufacture of goods have formed the basic aim of every company.
3. A business and the individuals of a business feel more secure if they exist for the performance of a service first and the securing of profit second.

Consumer Products

A. Modern Craft and Machine Ages

1. The consumer products were simple basic requirements of food, clothing and shelter for the common people or peasants.
2. The goods were manufactured for usefulness rather than for beauty or style.
3. The nobility had a desire for goods that were beyond the basic needs and emphasized the aesthetic beauty of certain objects which were specially and exclusively made for them.

B. Power Age

1. Technological advances resulted in a sufficient supply of goods for all and there was no longer a factor of producing the basic needs but rather a factor of producing what people desired or wanted.
2. Process industries were particularly successful and food was being placed on store shelves in new packages and in new forms which increased the storage life of the food.
3. Wholesaling and retailing came into practice.
4. The improvement of transportation, communication and the methods of marketing and distribution made goods available to all segments of the population.

C. Atomic and Cybernetics Ages

1. These ages saw a more diversified form of goods, many of which were classed as luxury items.
2. The most significant product was drugs which aided the population in developing and maintaining better health practices and combatting diseases.

3. During these ages there was an increase in the variety of household appliances available. Many items were accompanied by guarantees and items could be purchased with trade-ins.

Environment

1. Four factors of environment were inherent in all the ages, they are: physical, sociocultural, production techniques, and production design.
2. There is a two-way interaction between technology and environment.
3. Environment becomes the total setting in which a productive society functions.
4. Some of the more significant factors that influence the environmental development of a country include economic environment, cultural factors, physical geography, public policies and private interests, technological flexibility of a society, technological research capabilities, and government-industry co-operation.

Socialization

A. Modern Craft Age

1. The family group and the work surrounding it was most significant. Little of the outside world had an influence on these people.
2. Royalty and noblemen enjoyed the highest forms of art, philosophy, literature, technics, science, and religion and no attempt was made to diffuse this type of culture down the social scale.
3. Toward the end of this age the community became the center of social activity.

B. Machine Age

1. There was a decline of the rural community because people began to move from rural areas into cities to work in the factories.
2. Urbanization became evident.
3. Urbanization triggered a whole new concept of mass socialization.

C. Power Age

1. The Industrial Revolution and the introduction of new technologies threatened "human values". The more technology advanced, the more problems were created because of the inability to adapt to the change that was so influential.
2. There was an increase in the interaction of different societies and cultures as world travel slowly opened up.
3. The system of human values began to recognize the concept of industrialism and the influence of capitalism.
4. Some of the basic problems which had to be solved were:
 - (a) Change from a rural to an urban way of life.
 - (b) Socializing with more people.
 - (c) Recruitment and training of workers for specialized tasks.
 - (d) Adjustment of workers to the routine of factory work.
 - (e) Adjustment to the problems of urbanization.
 - (f) Adjustment caused by the increased level of living costs.

D. Atomic and Cybernetics Ages

1. This society was an affluent type of society.
2. Cybernation introduced such a vast change in social systems that much planning and understanding was needed to not only preserve the present society but also to keep it in line with technological developments.
3. Education had to be geared for employment and leisure because cybernation had resulted in more leisure time and individuals had to learn to adapt to the consequences.

APPENDIX B

Lewchuk's Opinionnaire on Productive Society

PART ONE

This part of the questionnaire is designed so that you can tell me what YOU consider are the most important characteristics of productive society in the teaching of YOUR industrial arts classes.

Examine the following pairs of characteristics. Please indicate by an X which characteristic of each pair you think is the more important one in the teaching of your classes.

Sample Question:

When teaching industrial arts, I believe the more important characteristic of productive society is:

Industrial Relations	X
Research	

If you place your X opposite industrial relations, then you are telling me that, in your opinion, you believe it is more important that industrial arts students be taught content related to the field of industrial relations rather than content related to the field of research.

Keep the [unstated] common stem in mind when responding to each pair of characteristics.

NOTE:

1. Respond to every pair.
2. Mark only one response for every pair.
3. Do not spend excessive time over any one pair of characteristics.
4. There are no right or wrong answers.

PLEASE REMEMBER TWO THINGS

1. For Part One of the questionnaire, the frame of reference to keep in mind is: WHEN TEACHING INDUSTRIAL ARTS, I BELIEVE THE MORE IMPORTANT CHARACTERISTIC OF PRODUCTIVE SOCIETY IS:

2. There are 252 pairs of characteristics. Please make one response for each pair.

The characteristics have been derived from an extensive review of literature and may appear somewhat vague. Please let YOUR own thoughts about each characteristic guide your responses. Please do not concern yourself with the statistical analysis of the questionnaire. (The pairs of characteristics now follow.)

OPINIONNAIRE OF PRODUCTIVE SOCIETY

PART ONE

WHEN TEACHING INDUSTRIAL ARTS, I BELIEVE THE MORE

IMPORTANT CHARACTERISTIC OF PRODUCTIVE SOCIETY IS:

Communication Information..... ..	Natural Resources..... ..
Environment	Inventions and Development..... ..
Natural Resources..... ..	Power and Energy..... ..
Planning and Control..... ..	Work Skills..... ..
Production Systems..... ..	Labor..... ..
Consumer Products..... ..	Training and Education..... ..
Natural Resources..... ..	Power and Energy..... ..
Scientific Development..... ..	Transportation..... ..
Natural Resources..... ..	Processes..... ..
Tools..... ..	Service Industries..... ..
Consumer Products..... ..	Labor..... ..
Environment..... ..	Economic Structure..... ..
Marketing..... ..	Production Systems..... ..
Planning and Control..... ..	Service Industries..... ..
Transportation..... ..	Production Systems..... ..
Environment..... ..	Planning and Control..... ..
Processes..... ..	Power and Energy..... ..
Consumer Products..... ..	Environment..... ..
Natural Resources..... ..	Tools..... ..
Materials..... ..	Marketing..... ..
Labor..... ..	Natural resources..... ..
Management and Personnel..... ..	Production Systems..... ..
Tools..... ..	Natural Resources..... ..
Economic Structure..... ..	Training and Education..... ..
Work Skills..... ..	Communication Information..... ..
Processes..... ..	Labor..... ..
Power and Energy..... ..	Processes..... ..
Labor..... ..	Socialization..... ..

Communication Information..... ..	Tools..... ..
Industrial Organization..... ..	Planning and Control..... ..
Scientific Development..... ..	Processes..... ..
Planning Control..... ..	Labor..... ..
Economic Structure..... ..	Inventions and Development.... ..
Industrial Organization..... ..	Production Systems..... ..
Processes..... ..	Planning and Control..... ..
Occupations..... ..	Socialization..... ..
Industrial Organization..... ..	Tools..... ..
Marketing..... ..	Occupations..... ..
Training and Education..... ..	Marketing..... ..
Service Industries..... ..	Occupations..... ..
Inventions and Development..... ..	Power and Energy..... ..
Processes..... ..	Processes..... ..
Planning and Control..... ..	Natural Resources..... ..
Environment..... ..	Work Skills..... ..
Training and Education..... ..	Materials..... ..
Occupations..... ..	Management and Personnel..... ..
Inventions and Development..... ..	Environment..... ..
Marketing..... ..	Socialization..... ..
Work Skills..... ..	Economic Structure..... ..
Production Systems..... ..	Marketing..... ..
Production Systems..... ..	Service Industries..... ..
Socialization..... ..	Environment..... ..
Tools..... ..	Industrial Organization..... ..
Training and Education..... ..	Service Industries..... ..
Marketing..... ..	Economic Structure..... ..
Environment..... ..	Service Industries..... ..
Planning and Control..... ..	Production Systems..... ..
Occupations..... ..	Processes..... ..
Occupations..... ..	Work Skills..... ..
Environment..... ..	Socialization..... ..

Marketing..... ..	Natural Resources..... ..
Socialization..... ..	Environment..... ..
Management and Personnel..... ..	Management and Personnel..... ..
Economic Structure..... ..	Economic Structure..... ..
Power and Energy..... ..	Communication Information..... ..
Production Systems..... ..	Service Industries..... ..
Marketing..... ..	Power and Energy..... ..
Training and Education..... ..	Scientific Development..... ..
Labor..... ..	Transportation..... ..
Industrial Organization..... ..	Training and Education..... ..
Marketing..... ..	Processes..... ..
Service Industries..... ..	Transportation..... ..
Management and Personnel..... ..	Materials..... ..
Environment..... ..	Processes..... ..
Processes..... ..	Labor..... ..
Planning and Control..... ..	Marketing..... ..
Power and Energy..... ..	Materials..... ..
Training and Education..... ..	Production Systems..... ..
Scientific Development..... ..	Materials..... ..
Management and Personnel..... ..	Economic Structure..... ..
Materials..... ..	Communication Information..... ..
Industrial Development..... ..	Training and Education..... ..
Work Skills..... ..	Transportation..... ..
Scientific Development..... ..	Marketing..... ..
Work Skills..... ..	Processes..... ..
Inventions and Development..... ..	Industrial Organization..... ..
Inventions and Development..... ..	Labor..... ..
Occupations..... ..	Environment..... ..
Materials..... ..	Tools..... ..
Communication Information..... ..	Communication Information..... ..
Transportation..... ..	Materials..... ..
Economic Structure..... ..	Planning and Control..... ..

Labor.....|..
Occupations.....|..

Materials.....|..
Marketing.....|..

Production Systems.....|..
Economic Structure.....|..

Communication Information.....|..
Economic Structure.....|..

Power and Energy.....|..
Planning and Control.....|..

Transportation.....|..
Labor.....|..

Materials.....|..
Transportation.....|..

Tools.....|..
Consumer Products.....|..

Marketing.....|..
Consumer Products.....|..

Power and Energy.....|..
Natural Resources.....|..

Communication Information.....|..
Planning and Control.....|..

Transportation.....|..
Industrial Organization.....|..

Labor.....|..
Service Industries.....|..

Processes.....|..
Communication Information.....|..

Service Industries.....|..
Consumer Products.....|..

Inventions and Development.....|..
Transportation.....|..

Processes.....|..
Management and Personnel.....|..

Communications Information.....|..
Marketing.....|..

Power and Energy.....|..
Occupations.....|..

Inventions and Development.....|..
Socialization.....|..

Power and Energy.....|..
Industrial Organization.....|..

Production Systems.....|..
Transportation.....|..

Labor.....|..
Consumer Products.....|..

Processes.....|..
Economic Structure.....|..

Scientific Development.....|..
Industrial Organization.....|..

Training and Education.....|..
Socialization.....|..

Consumer Products.....|..
Socialization.....|..

Communication Information.....|..
Consumer Products.....|..

Transportation.....|..
Occupations.....|..

Inventions and Development.....|..
Service Industries.....|..

Work Skills.....|..
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Training and Education.....|..

Processes.....|..
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Planning and Control.....|..
 Service Industries.....|..

Power and Energy.....|..
 Materials.....|..

Production Systems.....|..
 Communication Information.....|..

Industrial Organization.....|..
 Training and Education.....|..

Materials.....|..
 Training and Education.....|..

Management and Personnel.....|..
 Socialization.....|..

Tools.....|..
 Transportation.....|..

Production Systems.....|..
 Industrial Organization.....|..

Natural Resources.....|..
 Marketing.....|..

Production Systems.....|..
 Marketing.....|..

Materials.....|..
 Labor.....|..

Materials.....|..
 Service Industries.....|..

Tools.....|..
 Work Skills.....|..

Natural Resources.....|..
 Socialization.....|..

Tools.....|..
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Scientific Development.....|..
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Production Systems.....|..
 Management and Personnel.....|..

Processes.....|..
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Management and Personnel.....|..
 Consumer Products.....|..

Work Skills.....|..
 Environment.....|..

Inventions and Development.....|..
 Service Industries.....|..

Industrial Organization.....|..
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Occupations.....|..
 Service Industries.....|..

Economic Structure.....|..
 Planning and Control.....|..

Transportation.....|..
 Consumer Products.....|..

Labor.....|..
 Socialization.....|..

Economic Structure.....|..
 Training and Education.....|..

Inventions and Development.....|..
 Management and Personnel.....|..

Management and Personnel.....|..
 Marketing.....|..

Training and Education.....|..
 Environment.....|..

Tools.....|..
 Environment.....|..

Scientific Development..... ..	Transportation..... ..
Marketing..... ..	Management and Personnel..... ..
Communication Information..... ..	Inventions and Development..... ..
Socialization..... ..	Environment..... ..
Transportation..... ..	Tools..... ..
Service Industries..... ..	Service Industries..... ..
Natural Resources..... ..	Scientific Development..... ..
Consumer Products..... ..	Socialization..... ..
Tools..... ..	Natural Resources..... ..
Processes..... ..	Management and Personnel..... ..
Natural Resources..... ..	Production Systems..... ..
Service Industries..... ..	Labor..... ..
Management and Personnel..... ..	Work Skills..... ..
Occupations..... ..	Management and Personnel..... ..
Scientific Development..... ..	Inventions and Development..... ..
Environment..... ..	Scientific Development..... ..
Inventions and Development..... ..	Tools..... ..
Consumer Products..... ..	Management and Personnel..... ..
Industrial Organization..... ..	Work Skills..... ..
Occupations..... ..	Occupations..... ..
Scientific Development..... ..	Natural Resources..... ..
Communication Information..... ..	Industrial Organization..... ..
Work Skills..... ..	Materials..... ..
Industrial Organization..... ..	Consumer Products..... ..
Economic Structure..... ..	Inventions and Development..... ..
Consumer Products..... ..	Consumer Products..... ..
Management and Personnel..... ..	Inventions and Development..... ..
Service Industries..... ..	Occupations..... ..
Industrial Organization..... ..	Economic Structure..... ..
Environment..... ..	Socialization..... ..
Work Skills..... ..	Work Skills..... ..
Planning and Control..... ..	Marketing..... ..

Scientific Development.....|..
 Transportation.....|..

Industrial Organization.....|..
 Planning and Control.....|..

Transportation.....|..
 Communication Information.....|..

Work Skills.....|..
 Economic Structure.....|..

Planning and Control.....|..
 Consumer Products.....|..

Power and Energy.....|..
 Socialization.....|..

Labor.....|..
 Planning and Control.....|..

Materials.....|..
 Scientific Development.....|..

Natural Resources.....|..
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Inventions and Development....|..
 Communication Information.....|..

Production Systems.....|..
 Environment.....|..

Work Skills.....|..
 Service Industries.....|..

Occupations.....|..
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Power and Energy.....|..
 Consumer Products.....|..

Materials.....|..
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 Management and Personnel.....|..

Tools.....|..
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Inventions and Development....|..
 Industrial Organization.....|..

Natural Resources.....|..
 Communication Information.....|..

Materials.....|..
 Occupations.....|..

Inventions and Development....|..
 Economic Structure.....|..

Occupations.....|..
 Socialization.....|..

Materials.....|..
 Socialization.....|..

Inventions and Development....|..
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Natural Resources.....|..
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Power and Energy.....|..
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Tools.....|..
 Scientific Development.....|..

Transportation.....|..
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Work Skills.....|..
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Inventions and Development....|..
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Power and Energy.....|..
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Management and Personnel.....|..
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Service Industries.....|..

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Production Systems.....|..
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Management and Personnel.....|..
Training and Education.....|..

Economic Structure.....|..
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Power and Energy.....|..
Communication Information.....|..

Natural Resources.....|..
Economic Structure.....|..

Scientific Development.....|..
Labor.....|..

Industrial Organization.....|..
Consumer Products.....|..

Work Skills.....|..
Communication Information.....|..

Materials.....|..
Environment.....|..

Processes.....|..
Marketing.....|..

You've now completed PART ONE of my opinionnaire - thanks again.

Before you move on to PART TWO, would you please flip back through the preceeding 9 pages to ensure that you've responded to each of the pairs of characteristics.

OPINIONNAIRE OF PRODUCTIVE SOCIETY

PART TWO

Part Two contains 23 sets of statements. Each set consists of a series of descriptions of a particular characteristic of productive society.

Please examine the descriptions in each set and make two decisions.

1. Which description of a particular characteristic, in your opinion, is the most important one when you are teaching industrial arts.

2. Which description of a particular characteristic, in your opinion, is the least important when you are teaching industrial arts.

Place the letter of the description you choose in the space provided with each statement:

_____ is most important

_____ is least important

Sample Question:

When teaching the concept of Research as a characteristic of productive society in my industrial arts class, it is my opinion that content which emphasizes:

 C is most important

 D is least important

- A The utilization of one or two persons to conduct research
- B Research is not significantly important
- C The use of computers and skilled technicians to conduct research on a comprehensive basis
- D The use of research only in educational institutions

If, as in the example, you indicate C as the most important description, then you are telling me that, in your opinion, you believe that content related to the use of computers and skilled technicians to conduct research on a comprehensive basis is most important when teaching about research in your industrial arts classes.

If, as in the example, you indicate D as the least important, then you are telling me that the use of research only in educational institutions is the least important when teaching about research in your industrial arts classes.

PLEASE NOTE

1. Please respond to each set of descriptions about each characteristic, even if in your teaching industrial arts you do not teach that particular characteristic.

2. Make only two choices for each statement: one -- the most important, and two -- the least important.

1. When teaching the concept of Natural Resources as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Development of forests, land, minerals and water resources
- B Enforcing the conservation movement and more extensive use of research
- C The use of coal and iron
- D Use of land for agriculture and forests for structure and fuel

2. When teaching the concept of Management and Personnel as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Existence of bureaucratic control, hierarchial structure and techniques of innovations
- B Involvement of managers, foremen, inspectors and a simple authority structure
- C One man who controls the entire production

3. When teaching the concept of Communication Information as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The use of transistor, laser, long distance communication and electronics miniaturization
- B Radio, motion picture, television, microfilm, magnetic tape
- C Communication by water, rail, telephone, telegram
- D Communication by messenger and word of mouth
- E Two-way radio, radar, vacuum tube control of equipment.

4. When teaching the concept of Materials as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The use of wood, iron and bronze
- B The use of powdered metals, and alloys for greater strength and heat resistance
- C The use of steel and copper
- D The use of alloyed steels and aluminum alloys
- E The use of plastics, super alloys, magnesium and titanium

5. When teaching the concept of Socialization as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Decline of the rural community
- B Integration of societies and various cultures
- C Leisure time, mass society, modernization, technological influence
- D The family group is most important

6. When teaching the concept of Production Systems as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The use of transfer machines to replace manual material handling
- B The use of quality control, inspection, computer controlled production lines and systems organization
- C The application of machines to cutting tools which are manually controlled
- D Employing systems of mass production, automation and standardization.
- E The use of simple hand tools, manually operated

7. When teaching the concept of Work Skills as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Skilled inspector and mechanic used where mechanical operations replace the need for machine feeding or tending
- B The use of a generally skilled craftsman and unskilled manual labor
- C Highly skilled technicians used for increased maintenance and computer programming
- D A combination of machine use and skilled craftsman
- E The need for technicians, designers and planners

8. When teaching the concept of Training and Education as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The significance of apprenticeship
- B Simple education based upon religion, reading, writing and arithmetic
- C The significance of science and mathematics in the process of education
- D The use of manual training and some industrial training and general education
- E The importance of general education, professionalization, highly skilled industrial training, computer instruction

9. When teaching the concept of Marketing as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Involvement of foreign competition, increased consumption, improved strategies for marketing
- B Demand exceeds supply because of poor production techniques
- C Small amount of trade with foreign countries
- D Emphasis on increasing local and foreign consumption

10. When teaching the concept of Labor as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Labor is characterized by collective bargaining, worker morale, specialization, incentives, work motivation and conciliation
- B Labor involves a single craftsman who constitutes the sole form of productivity
- C Employee-employer relations are such that there is little regulation of worker time and conditions and the existence of only a few unions

11. When teaching the concept of Power and Energy as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Use of muscle, wind and water
- B Use of steam and the steam engine
- C Significance of electricity, petroleum, internal combustion engine and portable power
- D Development of atomic energy, hydraulic and jet power
- E Use of nuclear power, natural gas and solar energy conversion.

12. When teaching the concept of Inventions and Development as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The development of power conversion and mass production of textiles, iron and steel machinery
- B Development of scientific and technical research laboratories manned by professional inventors
- C Development of certain techniques which include the wheel, extracting process, metal bridges and the use of gasses
- D Development of mining, textile machinery and the establishment of modern chemistry to improve processes

13. When teaching the concept of Industrial Organization as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Individual owned and operated business enterprises and the establishment of craft guilds
- B Small companies privately owned with little organization control and the need for vast sums of money
- C Organization based upon corporations, utilities, public ownership, stock holders, and government control

PLEASE REMEMBER

Each set of statements contains several descriptions of a particular characteristic of productive society. Examine each description and make two decisions.

1. Which description of a particular characteristic is the most important one when teaching industrial arts.
2. Which description of a particular characteristic is the least important when teaching industrial arts.

14. When teaching the concept of Planning and Control as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Characterized by computers, data processing, numerical control, efficiency study, and quality control
- B Planning is performed by a single individual using blue printing and simple specifying and no quality control
- C The use of some feedback for purposes of data evaluation and processing and mechanization improvement

15. When teaching the concept of Tools as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A The use of simple hand tools for simple operations
- B Ultra-high speed computers and machine tools
- C Simple machines based upon wheel and shaft principle
- D The use of automatic machines to extend simple machines
- E The automatic factory was made possible because of precision

16. When teaching the concept of Processes as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Sheet glass, metal drawing, assembly line, extruding
- B Bessemer and open hearth steel, hydraulic pressing
- C Iron puddling, slip casting, cermentation carburization
- D Casting, forging, wood turning and casting on process

17. When teaching the concept of Scientific Development as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Scientific and technological work has become similar and science serves as a basis for further technological developments
- B Mathematics is clearly related to science and scientific developments are based upon simple principles
- C Certain developments in biology, chemistry and physics do not relate to industry and do not affect it

18. When teaching the concept of Consumer Products as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Household appliances, guarantees, luxury items, synthetic materials
- B Emphasis on simple utilitarian and aesthetic goods
- C Entrepreneurship, supply sufficient for all demands, retail-wholesale selling

19. When teaching the concept of Occupations as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Occupations are simple and do not involve detailed categorizations
- B Specialization, social mobility, job classifications are a part of occupations
- C Some occupational structure is evident with influence of class lines

20. When teaching the concept of Transportation as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Short range, small freight movement on land and water
- B Use of steamship and train for some continental travel
- C Use of large freight carrying aircraft and electronic control of road and airways
- D Use of jet aircraft and improved atomic applications
- E Use of diesel, conventional aircraft and improved roads for local travel

21. When teaching the concept of Services as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Maintenance and hardware service for small applications
- B Service industries such as hospitals, universities, government and domestic
- C Not significant

22. When teaching the concept of Environment as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Physical factors had an influence upon industrialization
- B Production techniques had an influence upon industrialization
- C Sociocultural factors had an influence upon industrialization
- D Production design factor had an influence upon industrialization

23. When teaching the concept of Economic Structure as a characteristic of productive society in my industrial arts classes, it is my opinion that content which emphasizes:

_____ is most important

_____ is least important

- A Large-scale capital investment into research and development
- B The use of limited outlay and profits with only a few wealthy
- C Investment into industry is not important
- D Increased productivity caused increased investment
- E Large capital investment and public ownership

APPENDIX C

Student's Opinionaire of Productive Society

Please read this booklet carefully before answering the "Student's Opinionaire of Productive Society". The booklet contains an explanation for each of the twenty-three terms that you will be dealing with in answering the opinionaire.

The exercise which you will be working on deals with productive society and is called the "Student's Opinionaire of Productive Society". This booklet gives you an explanation of what a productive society is and presents twenty-three different parts of a productive society.

A society is any organized group of people who live and work together. A productive society can be described as any group of people who are involved in the production of goods for humans to use. All groups of people or societies can be thought of as productive societies because all societies produce goods in one form or another. However, some societies are more productive than others because they are able to produce more goods and because they manufacture special types of goods which the other societies do not produce. Industry is one determiner of how productive society can be. Societies which are highly industrialized are highly productive societies. For example, the society in which you live is highly industrialized and, as a result, it is called a very productive society. India, Turkey and many parts of China, on the other hand, do not have much industry and therefore, they are not very productive. In the exercise which follows, you will be dealing with an industrial type of productive society. Such a productive society can be broken into twenty-three parts. The terms below explain each of these parts.

Communication Information

As a part of productive society, communication information is the act of giving or passing information to another by talking, writing, radio, telephone, or television.

Consumer Products

As a part of productive society consumer products are the goods which are used by the people. They can either be the basic goods of food, clothing and shelter, or they can be items such as automobiles, fancy clothes, and household appliances.

Economic Structure

As a part of productive society economic structure shows the connection between the way in which goods are made, how they are transferred from the maker to the user and how they are used. It deals with such things as how natural resources such as iron, petroleum and water can be put to use, how much money it would cost, where the money would come from, and what would people gain from the use of the resource.

Environment

Environment is all of the surroundings and all of the conditions in which a productive society exists. For example, land, water, mountains, forests, riots, pollution, climate, and people's attitudes are all a part of environment.

Industrial Organization

Industrial organization is the way industry is arranged. Industry is made up of many related parts such as: people, manufacturing, selling, partnerships and borrowing money. Each of the parts has a special duty within industry. As a part of productive society, industrial organization is the way all of the parts of industry are arranged to work together.

Inventions and Developments

As a part of productive society, inventions and developments can be thought of as: all of the new items which have been created or made, how these new items were worked out in detail so that they became useful, and what effect these new items had on productive society.

Labor

As a part of productive society, labor refers to all of the skilled and unskilled people who work for pay. These people are the "hired hands".

Management and Personnel

As a part of productive society, management and personnel refers to the relationship between the persons who give the orders and direct or handle a business (management) and the persons who are hired to carry out the orders and do the work (personnel).

Marketing

As a part of productive society, marketing deals with the selling of goods. It involves such things as trade, competition between companies, advertising, and methods of packaging the goods.

Materials

As a part of productive society, materials are what products are made from. For example, cloth, steel, and plastics are all materials from which different products can be made.

Natural Resources

As a part of productive society, natural resources are the materials which are supplied by nature. For example, iron ore, water and water power, and coal are all natural resources.

Occupations

An occupation is one's job, trade, or what one does for a living. As a part of productive society, occupations refer to the different types of jobs or trades which are available and how these jobs are classified. For example, the jobs may be classified as: unskilled manual workers (sweepers, janitors, ditch diggers), skilled manual workers (bricklayers, plumbers, carpenters) and professionals (doctors, lawyers, engineers). In addition to such a job classification there is also a different level of importance placed in each job. For example, doctors and engineers are considered more important than ditch diggers or sweepers.

Planning and Control

As a part of productive society, planning and control refers to the ways in which industries design or think out beforehand how something is to be done or made and how the making of something can be checked to see that it meets certain standards.

Power and Energy

Energy is the ability to do work such as lifting or moving an object.

Power is the force that can do work. For example, running water produces power to turn turbines and electricity provides power to turn electric motors.

As a part of productive society, power and energy refers to how the different types of power and energy are used and where this power and energy comes from.

Processes

As a part of productive society, processes are the changes made in a material to produce goods. For example, cloth is made by weaving process and flour is made from wheat by a grinding process.

Production Systems

As a part of productive society, production systems are the orderly steps followed in making or manufacturing something. Production systems are made up of a number of single processes which are done in a set order. For example, a production system for making dresses could be made up of the following steps and processes: 1. a cloth selection process, 2. a pattern selection process, 3. a cutting out process, 4. a sewing process, and 5. a packaging process.

Scientific Development

As a part of productive society, scientific development refers to the using of the laws and facts of science to figure something out in detail. For example, man landed on the moon as a result of scientific development.

Services

As a part of productive society, services or service industries are those industries which do not produce goods but perform some helpful act or task which is useful to others. Firemen, doctors, policemen, gas station attendants, teachers and postmen are some examples of service workers.

Socialization

Socialization is the process by which a person learns to live with the people around him. As a part of productive society, socialization also refers to the ways in which industry and technology have influenced or changed man's ways of living with others.

Tools

As a part of productive society, a tool is any instrument such as a hammer, a saw, a knife or a shovel that is used in doing work. Even complicated machines such as computers or typewriters are considered as tools because they are used to do work.

Training and Education

As a part of productive society, training and education refers to the practical knowledge skills and ability which a person must obtain or learn in order to get a job and keep up with the changes in his job.

Transportation

As a part of productive society, transportation refers to the means of moving something or some one from one place to another. For example, airplanes, ships, trucks and busses are forms of transportation.

Work Skills

As a part of productive society, work skills are the ability to do one's work well with his hands, tools, or his mind.

Now that you have read the explanations please complete the opinionaire. Remember that each of the above plays a part in any productive society. You may refer to the above explanations at any time while you are working on the opinionaire.

STUDENT'S OPINIONAIRE OF PRODUCTIVE SOCIETY

NOTE: Before beginning this exercise, please read the booklet which gives an explanation of the twenty-three parts of productive society.

GENERAL INFORMATION

Before you begin the exercise, please fill in the blanks below.

NAME : _____

AGE : _____

GRADE : _____

HAVE YOU TAKEN INDUSTRIAL ARTS IN SCHOOL? _____

NAME OF SCHOOL YOU ARE ATTENDING: _____

STUDENT'S OPINIONAIRE OF PRODUCTIVE SOCIETY

As stated in the booklet explaining the parts of productive society, a productive society can be broken into twenty-three parts. The purpose of this exercise is to find out what you think are the more important parts of productive society. In this exercise the twenty-three parts of productive society are paired with each other as shown below:

Materials	
Processes	

Tools	
Work Skills	

Please examine each pair carefully and then decide which of the parts in the pair is more important as a part of productive society. Mark an X opposite that part. For example:

Materials	X
Processes	

If you mark an X opposite materials, then you are saying that you think materials are more important, as a part of productive society, than processes.

Please remember that there are no right or wrong answers because the exercise is designed to find out what YOU THINK are the more important parts of productive society. In addition please remember:

1. To mark an answer for each pair.
2. To mark only one answer for each pair.

Tools
Socialization

Work Skills
Scientific Development

Production Systems
Occupations

Materials
Occupations

Tools
Training and Education

Marketing
Planning and Control

Power and Energy
Socialization

Work Skills
Environment

Training and Education
Environment

Occupations
Consumer Products

Power and Energy
Labor

Transportation
Service Industries

Work Skills
Service Industries

Scientific Developments
Economic Structure

Marketing
Occupations

Labor
Industrial Organization

Planning and Control
Occupations

Communication Information
Marketing

Labor
Management and Personnel

Management and Personnel
Service Industries

Materials
Industrial Organization

Inventions and Developments
Occupations

Labor
Occupations

Tools
Service Industries

Labor
Economic Structure

Communication Information
Occupations

Processes
Environment

Marketing
Environment

Occupations
Socialization

Economic Structure
Marketing

Power and Energy
Industrial Organization

Tools
Communication Information

Power and Energy	
Production Systems	

Inventions and Development	
Communication Information	

Production Systems	
Management and Personnel	

Training and Education	
Service Industries	

Scientific Development	
Transportation	

Service Industries	
Socialization	

Labor	
Marketing	

Tools	
Scientific Development	

Industrial Organization	
Occupations	

Processes	
Marketing	

Production Systems	
Communication Information	

Natural Resources	
Processes	

Power and Energy	
Materials	

Occupations	
Environment	

Management and Personnel	
Training and Education	

Labor	
Training and Education	

Materials	
Transportation	

Power and Energy	
Economic Structure	

Work Skills	
Processes	

Inventions and Developments	
Economic Structure	

Industrial Organization	
Consumer Products	

Tools	
Planning and Control	

Work Skills	
Transportation	

Production Systems	
Environment	

Industrial Organization	
Socialization	

Communication Information	
Socialization	

Communication Information	
Labor	

Transportation	
Management and Personnel	

Tools	
Environment	

Inventions and Developments	
Scientific Development	

Natural Resources	
Inventions and Development	

Transportation	
Training and Education	

Management and Personnel	
Socialization	

Transportation	
Communication Information	

Work Skills	
Occupations	

Scientific Development	
Labor	

Materials	
Work Skills	

Processes	
Labor	

Tools	
Work Skills	

Production Systems	
Training and Education	

Transportation	
Socialization	

Inventions and Developments	
Industrial Organization	

Tools	
Consumer Products	

Scientific Development	
Industrial Organization	

Production Systems	
Marketing	

Power and Energy	
Processes	

Inventions and Developments	
Environment	

Economic Structure	
Socialization	

Work Skills	
Economic Structure	

Management and Personnel	
Consumer Products	

Inventions and Developments	
Planning and Control	

Processes	
Economic Structure	

Natural Resources	
Marketing	

Materials	
Consumer Products	

Scientific Development	
Training and Education	

Economic Structure	
Occupations	

Transportation	
Marketing	

Processes	
Communication Information	

Power and Energy	
Scientific Development	

Materials	
Processes	

Production Systems	
Industrial Organization	

Work Skills	
Marketing	

Planning and Control	
Service Industries	

Natural Resources	
Consumer Products	

Transportation
Consumer Products

Economic Structure
Environment

Natural Resources
Management and Personnel

Materials
Labor

Tools
Processes

Processes
Management and Personnel

Power and Energy
Occupations

Production Systems
Economic Structure

Marketing
Training and Education

Power and Energy
Work Skills

Scientific Development
Communication Information

Materials
Management and Personnel

Tools
Transportation

Communication Information
Planning and Control

Labor
Service Industries

Natural Resources
Socialization

Inventions and Developments
Processes

Labor
Planning and Control

Natural Resources
Training and Education

Management and Personnel
Marketing

Environment
Socialization

Labor
Environment

Processes
Occupations

Inventions and Developments
Marketing

Tools
Management and Personnel

Natural Resources
Industrial Organization

Production Systems
Socialization

Production Systems
Transportation

Scientific Development
Socialization

Work Skills
Management and Personnel

Power and Energy
Environment

Tools
Industrial Organization

Materials	
Planning and Control	
Consumer Products	
Socialization	
Economic Structure	
Training and Education	
Management and Personnel	
Occupations	
Natural Resources	
Economic Structure	
Power and Energy	
Marketing	
Tools	
Materials	
Transportation	
Planning and Control	
Training and Education	
Occupations	
Industrial Organization	
Marketing	
Natural Resources	
Materials	
Management and Personnel	
Economic Structure	
Scientific Development	
Service Industries	
Inventions and Developments	
Socialization	
Processes	
Transportation	
Production Systems	
Service Industries	

Materials	
Socialization	
Communication Information	
Training and Education	
Natural Resources	
Environment	
Processes	
Socialization	
Power and Energy	
Transportation	
Power and Energy	
Tools	
Materials	
Production Systems	
Service Industries	
Environment	
Industrial Organization	
Planning and Control	
Natural Resources	
Labor	
Marketing	
Service Industries	
Scientific Development	
Management and Personnel	
Economic Structure	
Planning and Control	
Planning and Control	
Training and Education	
Tools	
Production Systems	
Power and Energy	
Communication Information	

Materials
Scientific Development

Work Skills
Inventions and Developments

Production Systems
Planning and Control

Marketing
Consumer Products

Inventions and Developments
Service Industries

Work Skills
Communication Information

Scientific Development
Processes

Economic Structure
Service Industries

Inventions and Developments
Training and Education

Processes
Planning and Control

Economic Structure
Consumer Products

Processes
Training and Education

Communication Information
Consumer Products

Materials
Marketing

Communication Information
Management and Personnel

Scientific Development
Marketing

Work Skills
Socialization

Power and Energy
Consumer Products

Materials
Environment

Industrial Organization
Training and Education

Tools
Marketing

Natural Resources
Tools

Work Skills
Labor

Tools
Economic Structure

Communication Information
Industrial Organization

Natural Resources
Scientific Development

Processes
Industrial Organization

Transportation
Economic Structure

Processes
Service Industries

Natural Resources
Planning and Control

Management and Personnel
Planning and Control

Work Skills
Production Systems

Processes
Consumer Products

Materials
Inventions and Developments

Production Systems
Labor

Natural Resources
Production Systems

Scientific Development
Consumer Products

Natural Resources
Service Industries

Tools
Occupations

Marketing
Socialization

Power and Energy
Training and Education

Power and Energy
Natural Resources

Labor
Socialization

Consumer Products
Environment

Service Industries
Consumer Products

Economic Structure
Industrial Organization

Training and Education
Socialization

Natural Resources
Communication Information

Work Skills
Industrial Organization

Communication Information
Service Industries

Management and Personnel
Environment

Scientific Development
Planning and Control

Inventions and Developments
Labor

Work Skills
Consumer Products

Power and Energy
Inventions and Developments

Scientific Development
Production Systems

Tools
Labor

Transportation
Occupations

Management and Personnel
Industrial Organization

Transportation
Industrial Organization

Natural Resources
Work Skills

Inventions and Developments
Management and Personnel

Materials
Communication Information

Work Skills
Training and Education

Power and Energy	
Planning and Control	

Industrial Organization	
Service Industries	

Planning and Control	
Environment	

Labor	
Consumer Products	

Planning and Control	
Consumer Products	

Industrial Organization	
Environment	

Scientific Development	
Environment	

Natural Resources	
Occupations	

Power and Energy	
Management and Personnel	

Inventions and Developments	
Production Systems	

Occupations	
Service Industries	

Materials	
Economic Structure	

Transportation	
Environment	

Natural Resources	
Transportation	

Planning and Control	
Socialization	

Inventions and Developments	
Consumer Products	

Materials	
Training and Education	

Tools	
Inventions and Developments	

Work Skills	
Planning and Control	

Materials	
Service Industries	

Training and Education	
Consumer Products	

Scientific Development	
Occupations	

Inventions and Developments	
Transportation	

Communication Information	
Economic Structure	

Communication Information	
Environment	

Transportation	
Labor	

Production Systems	
Consumer Products	

Power and Energy	
Service Industries	

Production Systems	
Processes	

STUDENT'S OPINIONAIRE OF PRODUCTIVE SOCIETY

NOTE: Before beginning this exercise, please read the booklet which gives an explanation of the twenty-three parts of productive society.

GENERAL INFORMATION

Before you begin the exercise, please fill in the blanks below.

NAME : _____

AGE : _____

GRADE : _____

HAVE YOU TAKEN INDUSTRIAL ARTS IN SCHOOL? _____

NAME OF SCHOOL YOU ARE ATTENDING: _____

As stated in the booklet of explanations, any productive society can be broken into twenty-three parts. The purpose of this exercise is to find out:

1. What you think is most important about these parts in our type of productive society.
2. What you think is least important about these parts in our type of productive society.

The exercise has twenty-three questions. In each question you are given a statement such as: "When I think of Natural Resources as a part of our productive society, I think that:". Below this statement you are given several other statements which are not complete. You are required to complete two of these statements by deciding:

1. Which statement is most important, in our type of productive society, and placing the letter of that statement in the space provided at the bottom of each question.
2. Which statement is least important, in our type of productive society, and placing the letter of that statement in the space provided at the bottom of each question.

The following is a sample question:

When I think of Tools as a part of our productive society, I think that:

- A. The use of hammers and saws
- B. The use of electric tools
- C. The use of complicated machines and tools

<u> </u> B	is most important
<u> </u> A	is least important

If you place B opposite "is most important", then you are saying that you think that the use of electric tools is most important in our type of productive society. If you place A opposite "is least important", then you are saying that you think that the use of hammers and saws is least important in our type of society.

Please Remember:

1. There are no right or wrong answers.
2. Answer each question completely.

1. When I think of Natural Resources as a part of our productive society I think that:

- A. The increased use of forests, minerals and water resources
- B. The use of research to find ways of using resources so that they will not be wasted
- C. The use of coal and iron
- D. The use of land for farming and the use of forests for fuel and building materials

_____ is most important.
_____ is least important.

2. When I think of Management and Personnel as a part of our productive society, I think that:

- A. A situation where one man gives all the orders, is in charge of all the men and controls the total production operation
- B. A situation where an industry is divided into many departments (sales department, production department, engineering department), and where each department has several bosses whose orders are passed downward from the person with the highest rank such as a manager to each lower level of boss
- C. A situation where there are several people such as managers, foremen and inspectors giving orders and making decisions

_____ is most important.
_____ is least important.

3. When I think of Communication Information as a part of our productive society, I think that:

- A. The use of tiny electronic parts to make long distance communication on earth and to other planets possible
- B. The use of radio, motion pictures and television for communication
- C. The use of water, railroads, telephone and telegram for communication
- D. The use of radios which can send and receive messages (two-way radios), radar, and computers for communication
- E. The use of messengers and talking as the main methods of communication

_____ is most important.
_____ is least important.

4. When I think of Materials as a part of our productive society, I think that:

- A. The use of wood, iron, and bronze
- B. The use of science to find improved ways of handling materials to prevent waste in manufacture and to reduce damage while moving the materials from place to place
- C. The use of steel and copper
- D. The use of steel alloys and aluminum alloys
- E. The use of materials which have properties such as very high strength, high resistance to heat, and light weight

_____ is most important.
 _____ is least important.

5. When I think of Socialization as a part of our productive society, I think that:

- A. A society which is changing from a country way of life to a city way of life
- B. A society which is changing from being made up of many different cultures to a society with only one culture
- C. A society which is being influenced by technology and as a result has more free (leisure) time
- D. A society which is mainly influenced by the family

_____ is most important.
 _____ is least important.

6. When I think of Production Systems as a part of our productive society, I think that:

- A. The use of machines to replace the handling of materials by hand
- B. The use of computers to control the manufacture and the quality of a product
- C. The use of machines which are operated by hand
- D. The use of mass production and automatic factories
- E. The use of hand tools

_____ is most important.
 _____ is least important.

7. When I think of Work Skills as a part of our productive society, I think that:

- A. The use of machines resulting in an increased need for skilled mechanics
- B. The use of craftsmen and unskilled men
- C. The use of highly skilled men for operating computers and repairing complicated machinery
- D. The use of machines to replace craftsmen
- E. The use of skilled men such as designers, engineers, and planners

_____ is most important.
 _____ is least important.

8. When I think of Training and Education as a part of our productive society, I think that:

- A. A type of education where a person receives a training in a trade by working for someone who is skilled in the trade (apprenticeship)
- B. A simple type of education based on religion, reading, writing and arithmetic
- C. A type of education which stresses mathematics and science
- D. A type of education which stresses some industrial training and training to develop skill in using the hands
- E. A type of education which stresses training for highly specialized jobs in industry such as operating or repairing computers

_____ is most important
 _____ is least important

9. When I think of Marketing as a part of our productive society, I think that:

- A. A marketing situation which depends upon competition with other countries, department stores and shopping centers, and extensive advertising to increase sales
- B. A marketing situation where the demand for goods is greater than the amount of goods which are available
- C. A marketing situation where there is a small amount of trade with other countries
- D. A marketing situation where all goods are available to almost every one in the country and where sales in other countries are increasing greatly

_____ is most important.
 _____ is least important.

10. When I think of Labor as a part of our productive society, I think that:

- A. A situation where workers have gained guaranteed wages, holidays with pay, regular working hours, and laws to protect the workers from unjust treatment by the employer
- B. A situation where a single craftsman produces the whole product by himself
- C. A situation where there are no regular working hours, the working conditions are poor and child labor is used

_____ is most important.
 _____ is least important.

11. When I think of Power and Energy as a part of our productive society, I think that:

- A. The use of muscles, wind and water as sources of power
- B. The use of steam and the steam engine as sources of power
- C. The use of electricity, petroleum, the gasoline engine and the diesel engine as sources of power
- D. The use of atomic energy, jet propulsion, and energy obtained by compressing or squeezing liquids and gasses as sources of power
- E. The use of natural gas, nuclear energy, and energy from the sun as sources of power

_____ is most important.
 _____ is least important.

12. When I think of Inventions and Developments as a part of our productive society, I think that:

- A. A situation where great improvements are being achieved in the mass production (producing in large quantities) of cloth products and iron and steel machinery
- B. A situation where engineers and scientists work together to discover and produce new, improved products, tools, and machines
- C. A situation where the following are being developed: the water wheel, metal bridges, and the making of iron from iron ore
- D. A situation where mining machinery, cloth making machinery, and chemistry are being developed

_____ is most important.
 _____ is least important.

13. When I think of Industrial Organization as a part of our productive society, I think that:

- A. A situation where a business is owned and operated by one man
- B. A situation where small companies exist but the need for big sums of money to run them is forcing the small companies out of business
- C. A situation where huge businesses (corporations) exist which are owned by many people (shareholders) and which are controlled by government laws

_____ is most important.
 _____ is least important.

14. When I think of Planning and Control as a part of our productive society, I think that:

- A. A type of planning and control where computers are used to run machines, design products, and check the quality of an item during different stages of production
- B. A type of planning and control where one skilled man does a simple form of planning and organizing of machines, tools and materials for manufacturing
- C. A type of planning and control where several people are involved in making detailed drawings (blueprints) and plans for production and some checks on the quality of the product are made during production

_____ is most important.
 _____ is least important.

15. When I think of Tools as a part of our productive society, I think that:

- A. The use of simple hand tools
- B. The use of computers and machines which are run by computers
- C. The use of simple power driven machines to replace hand tools
- D. The use of some automatic machines to replace some of the simple power driven machines
- E. The use of automatic factories where all machines and all phases of production are automatically run

_____ is most important.
 _____ is least important.

16. When I think of Processes as a part of our productive society, I think that:

- A. The development of processes for the production of fertilizers, drugs, and many different types of plastics
- B. The development of processes for the production of aluminum and for the production of steel by two common methods (bessemer process, open hearth process)
- C. The development of processes for the production of rubber, and for the production of gas from coal to use for heating and lighting
- D. The development of processes to produce iron articles by pouring melted iron into molds having the shape of the required article or by hammering hot iron into the required shape

_____ is most important.
 _____ is least important.

17. When I think of Scientific Development as a part of our productive society, I think that:

- A. A situation where science and scientific developments play an important part in the changes being made in industry and productive society
- B. A situation where scientists are becoming interested in how their discoveries can be applied to technology and industry
- C. A situation where there is little or no scientific development and only a few simple scientific principles are applied to industry

_____ is most important.
 _____ is least important.

18. When I think of Consumer Products as a part of our productive society, I think that:

- A. A situation where there are many types of products such as drugs, household appliances, and automobiles and where many products have guarantees and can be purchased with a "trade in"
- B. A situation where consumer products consist of the basic needs of food, clothing and shelter
- C. A situation where there is a good supply of food, clothing, and shelter for everyone and a wide choice of other goods is becoming possible

_____ is most important.
 _____ is least important.

19. When I think of Occupations as a part of our productive society, I think that:

- A. A situation where the occupations which exist are simple and are very simply classified into areas such as farm hand or factory worker
- B. A situation where there are many different types of occupations and where the type of occupation a person has determines how highly he is looked upon by others
- C. A situation where occupations are beginning to be classified and people are beginning to specialize in certain occupations

_____ is most important.
_____ is least important.

20. When I think of Transportation as a part of our productive society, I think that:

- A. The use of wagons pulled by animals and small boats to move small amounts of cargo for short distances
- B. The use of steamships and trains for moving cargo and people
- C. The use of large freight carrying airplanes, large passenger aircraft (jumbo jets) and rockets for moving cargo and people
- D. The use of jet airplanes, atomic powered ships, and helicopters for moving cargo and people
- E. The use of propeller driven airplanes, diesel locomotives and automobiles for moving cargo and people

_____ is most important.
_____ is least important.

21. When I think of Service Industries as a part of our productive society, I think that:

- A. A situation where services consist of doing small amounts of machine and tool repair
- B. A situation where many services and service industries exist such as hospitals, universities, laundry and dry cleaning services, and library services
- C. A situation where services do not exist and are not important to productive society

_____ is most important.
_____ is least important.

22. When I think of Environment as a part of our productive society, I think that:

- A. Physical factors such as available resources, climate, and nearness to large bodies of water influence industry and the rate of industrial advance
- B. Production methods and the way in which labor, equipment and materials are organized for production influence industry and the rate of industrial advance
- C. Factors such as attitudes and habits of consumers, attitudes and abilities of labor and management, and laws influence industry and the rate of industrial advance.
- D. Factors such as the type of product being produced, the costs of production, and the amount being produced influence industry and the rate of industrial advance

_____ is most important.
 _____ is least important.

23. When I think of Economic Structure as a part of our productive society, I think that:

- A. A situation where vast sums of money are being invested in research to find ways of increasing production and overcoming competition
- B. A situation where small sums of money are being invested into industry by a few wealthy businessmen
- C. A situation where there is little or no investment of money into industry because investment is not important
- D. A situation where increased production is resulting in increased investments into industry
- E. A situation where large sums are being invested and spent to make factories and equipment completely automatic

_____ is most important.
 _____ is least important.

APPENDIX D

Copies of Letters

AS NICHOLS, B.Sc., LL.B.

TIGHEN, B.A., B.ED.
NDENT

LE, B.A., B.ED., M.A.
OF EDUCATION

G HEISLER, C.A.
-TREASURER

ARZOCCO, B.A.Sc., P.ENG.
OF BUILDINGS AND GROUNDS



Calgary Roman Catholic Separate School District No. 1

CATHOLIC SCHOOL CENTRE • 300 SIXTH AVE. S.E.

Calgary 21, Alberta

October 4th, 1969

Mr. John Adamec,
2020 Urguhart Road N. W.,
Calgary, Alberta.

Dear Mr. Adamec:

We would be prepared at this time to allow you to use some junior high school students in the Calgary Separate School System as the population for your study "An Assessment of the Understanding of the Productive Society Held by Junior High School Students". Clearance for contact with school personnel required would be obtained through Dr. J. A. Earle.

In advance of this stage I would ask to receive a sample of your multiple choice test for a quick review of the type of questions being asked.

OTE, B.Sc., P.ENG.

IGHEM, B.A., B.Ed.
DENT

, M.A., Ph.D.
Y EDUCATION

HEISLER, C.A.
REASURER

ARZOCCO, B.A.Sc., P.ENG.
BUILDINGS AND GROUNDS



Calgary Roman Catholic Separate School District No. 1

CATHOLIC SCHOOL CENTRE - 300 SIXTH AVE. S.E.

Calgary 21, Alberta

December 4, 1969.

Mr. John Adamec,
2020 Urquhart Road N.W.,
Calgary 44, Alberta.

Dear Mr. Adamec:

With regard to your request for pupil lists in your letter of November 26, 1969, I regret that I cannot supply such lists until the instrument you propose to administer has been reviewed by the Superintendent. When I receive his approval of the instrument I will advance to make pupil lists available to you.

CATHOLIC SCHOOL CENTRE

March 17, 1970.

TO JUNIOR HIGH PRINCIPALS:

Re: The Productive Society
- A Master's Study by Mr. Adamec
through the University of Alberta

Mr. Adamec proposes to administer a questionnaire to selected Junior High School students at their Industrial Arts and Home Economics classes during March and April of this year. He will make the necessary arrangement with the teachers and consultants' involved. This project has the approval of Mr. Van Tighem and the University Liaison Committee.

Your co-operation is requested.

John J. Nearing,
Coordinator, Secondary Education.

JJN/jep

P.S. Principals with Industrial Arts and Home Economics facilities:

Please bring this letter to the attention of the teachers concerned.

APPENDIX E

Lewchuk's Chart
(Chart on Back Cover in an Envelope)

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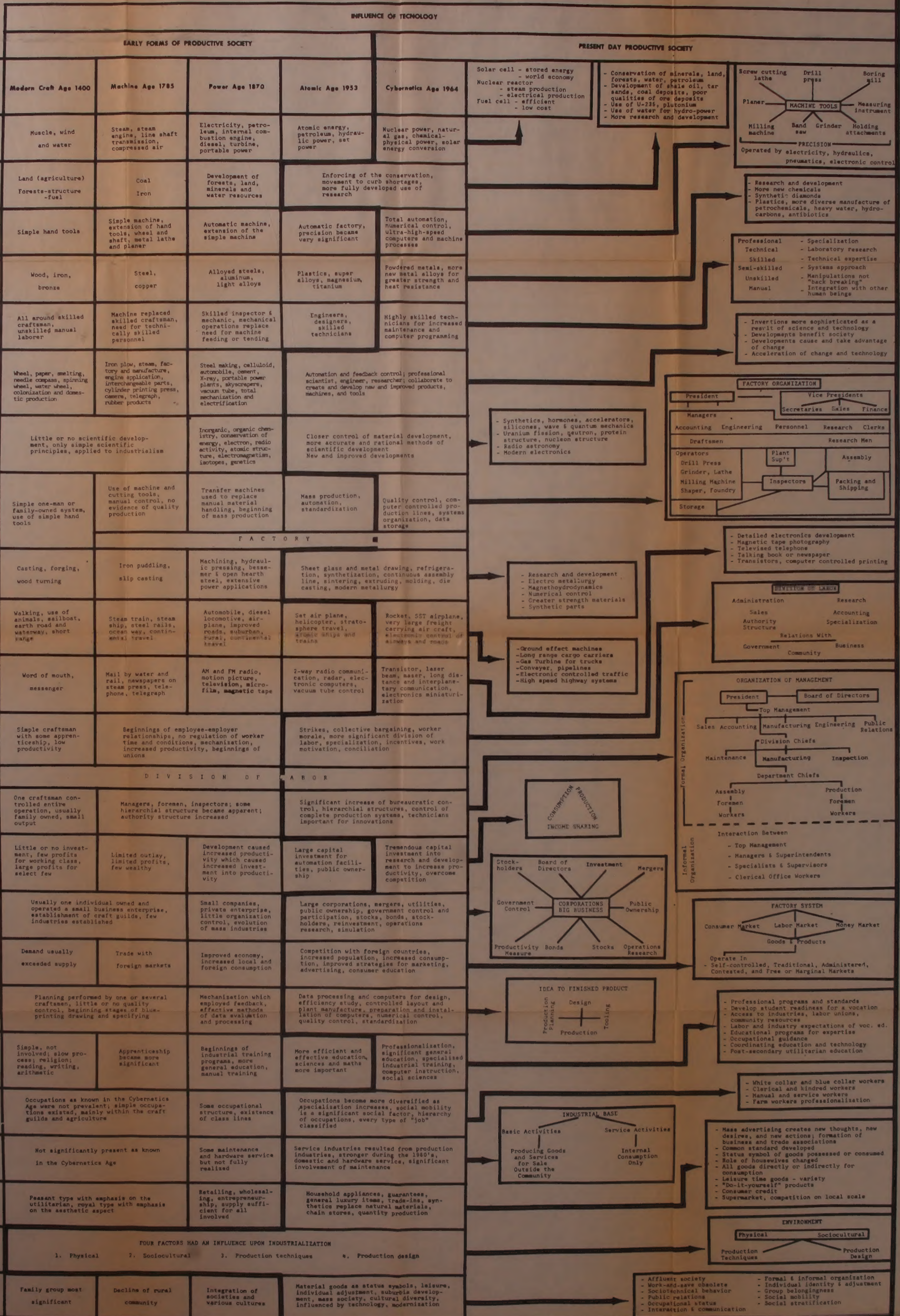
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THE FIVE AGES OF PRODUCTIVE SOCIETY



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